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GOVERNMENT REPORTS

Announcements & Index

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NATIONAL TECHNICAL INFORMATION SERVICE Melvin S. Day, Director

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GOVERNMENT REPORTS

Announcements & Index

Volume 80, Number 8 April 11, 1980

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* Committee on Scientific and Technical Information

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MAIN ENTRY

Report entries are arranged by subject group and field. Within fields they are arranged alphanumerically by NTIS order number (accession number); alphabetic data precedes numeric.

Field 10 ENERGY CONVERSION (NON-PROPULSIVE)

Group 10A Conversion Techniques

Order number
Corporate author
Personal author

PB-254 315/5GA PC **A16**/MF **A01** — Price codes
Smithsonian Science Information Exchange, Inc., Washington, D.C.
Information on International Research and Development Activities in the Field of Energy, David F. Hersey. May 76, 370p* NSF/RA-760057, Grant NSF-AER74-20678 — Report title

This directory is the product of a data collection effort undertaken by the Smithsonian Science Information Exchange (SSIE) on behalf of an interagency committee formed under the U.S. State Department to provide international cooperation in energy research and development. Included is information covering 1766 ongoing and recently completed energy research projects conducted in Canada, Italy, the Federal Republic of Germany, France, the Netherlands, the United Kingdom, and 25 other countries. In addition to the title and text of project summaries, the directory contains the following indexes: Subject Index, Investigator Index, Performing Organization Index, and Supporting Organization Index. — Abstract of report

INDEX ENTRIES

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SUBJECT

ENERGY
Information on International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A

Entries are sequenced by major subject term and by NTIS order number.

PERSONAL AUTHOR

HERSEY, DAVID F.
Information in International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A

Entries are sequenced by personal author, report title, and NTIS order number.

CORPORATE AUTHOR

SMITHSONIAN SCIENCE INFORMATION EXCHANGE, INC., WASHINGTON, D.C.
Information on International Research and Development Activities in the Field of Energy.
(NSF/RA-760057)
PB-254 315/5GI 10A

Entries are sequenced by corporate author name, original report number, and NTIS order number. The monitor agency number is given following the report title.

CONTRACT GRANT NUMBER

NSF-AER74-20678
Smithsonian Science Information Exchange, Inc., Washington, D.C.
PB-254 315/5GI 10A

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PB-254 315/5GI
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PB-254 315/5GI 10A PC **A16**/MF **A01**

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REPORTS ANNOUNCEMENTS

1. AERONAUTICS

1A. Aerodynamics

AD-A078 333/2 PC **A02/MF A01**
Royal Aircraft Establishment Farnborough (England)
A Comment on the Origin of Endwall Interference in Wind-Tunnel Tests of Aerofoils.
Technical memo.,
K. G. Winter, and J. H. B. Smith. Aug 79, 20p
RAE-TM-AERO-1816, DRIC-BR-70172

Tests have been made recently at ONERA on the interference effects arising from the presence of the boundary layers on the walls at the ends of an aerofoil spanning the working section of a wind tunnel. The tests revealed a behaviour different from that predicted by the theory of Preston. A qualitative assessment of the problem is made and it is suggested that the interference is better explained in terms of changes in the displacement thickness of the boundary layers on the tunnel walls than in terms of induced effects from trailing vorticity. (Author)

AD-A078 367/0 PC **A04/MF A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD Aviation and Surface Effects Dept
Parametric Analysis of Close Coupled Canard Transonic Aerodynamics for a Generalized Wing-Body Configuration.
Final rept.,
Jonah Ottensoser. May 77, 63p Rept no. DTNSRDC/ASED-399

An experimental parametric analysis has been completed for close-coupled canard effects on the transonic aerodynamics of a generalized wing-body aircraft configuration. The parameters investigated include wing sweep and position and deflection and planform of the canard for aircraft configurations with horizontal tail on and tail off. It was found that a 45-degree delta canard at approximately -5-degrees deflection, located above and forward of but slightly overlapping the wing, gave the best overall performance. A canard placed properly with respect to a 50-degree sweep wing resulted in aerodynamic performance suitable for a highly maneuverable fighter. Further, a close-coupled canard used with the 25-degree sweep wing resulted in aerodynamic performance desirable for attack/bomber missions. In addition, it was found that a properly placed canard was useful in alleviating aircraft buffet, particularly on the wing with the 50-degree leading edge sweep. (Author)

AD-A078 401/7 PC **A03/MF A01**
Weapons Systems Research Lab Adelaide (Australia)
A Wind Tunnel Facility to Examine Flow Fields and Compute Profile Drag.
Technical rept.,
G. H. S. Pike. Apr 79, 35p Rept no. WSRL-0092-TR

This report describes a facility which has been developed for the S-1 Wind Tunnel at WSRL both to examine flow fields and to compute the profile drag of bodies by the wake traverse method. The emphasis in this report is on software as existing hardware was used and this has been documented elsewhere. Examples are given which demonstrate the generation of CALCOMP plots of a flow field parameter and the use of the facility in measuring the installed drag of externally carried stores on an aircraft. (Author)

AD-A078 588/1 PC **A03/MF A01**
Scientific Research Associates Inc Glastonbury CT
Viscous Flow in the Region of a Rounded Trailing Edge.
Final rept. 1 Jul 78-30 Jun 79,
Ralph Levy, W. Roger Briley, and Henry McDonald. 31 Jul 79, 41p Rept no. R79-920003-F
Contract N00019-78-C-0470

The Interactive Zone Embedding concept is a generalization of concepts which have been used for some time with boundary layer analyses. This concept has been extended to more complex flows using a potential flow for the outer zone and the compressible Navier-Stokes equations for the inner zone. In this interactive manner the flow about a rounded trailing edge was computed for two locations of the outer boundary. The calculations were performed on a 5:1 elliptic cylinder at a Mach number of 0.2 and a Reynolds number based on chord of 1,000. A body fitted conformal coordinate system was used. In the first instance the outer boundary was located approximately one chord from the ellipse and in the second the outer boundary was brought to about one-half chord of the ellipse. The displacement body was chosen as the interactive streamline and the potential flow over this streamline was computed as the sum of the analytic potential flow over the elliptic cylinder plus the flow from a series of sources. The strengths of these sources were determined to make the interaction streamline also be a streamline in the potential flowfield. The resulting potential flow was used to evaluate the static pressure at the outflow boundary of the Navier-Stokes zone. The calculations were performed with the large Navier-Stokes domain and were repeated with a smaller Navier-Stokes domain. The flow properties in the vicinity of the body of the two calculations were in excellent agreement.

ESDU-78009 PC**$674.50**
Engineering Sciences Data Unit Ltd., London (England).
Transonic Data Memorandum: A Framework Relating the Drag-Rise Characteristics of a Finite Wing/Body Combination to Those of Its Basic Aerofoil.
Data item.
c1978, 31p ISBN-0-85679-269-1
Also pub. as ISSN-0141-4356.
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

The report presents a framework that formulates a relationship between the drag-rise characteristics of a well-designed wing/body combination and the wing's basic airfoil, indicates how the framework may find application in aircraft design, and provides an example of its use to reconcile the drag-rise characteristics of a swept wing/body combination and its basic aerofoil. The results derived may be used to reconcile the known drag-rise characteristics of an existing wing design with the known drag-rise characteristics of its basic airfoil. The research applies to wings of aspect ratio greater than about 4 and sweep angles up to about 45 degrees.

ESDU-78010 PC**$770.50**
Engineering Sciences Data Unit Ltd., London (England).
Transonic Data Memorandum: The Lift Achievable by Aerofoils Having a Particular Form of Supercritical Upper-Surface Pressure Distribution That Yields Only Small Wave Drag.
Data item.
c1978, 31p ISBN-0-85679-270-5
Also pub. as ISSN-0141-4356.
For information on availablity of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

The report estimates drag-rise Mach number as a function of lift-coefficient and thickness/chord ratio for a family of airfoils characterized by a particular form of supercritical upper-surface pressure distribution. The result obtained may be used to provide exchange rates between parameters pertinent to the design of the basic two-dimensional section of swept-winged aircraft intended to cruise at high-subsonic Mach numbers. The research is applicable to thickness/chord ratios ranging from 6 percent to 18 percent chord and upper-surface pressure distributions having supercritical flow for up to 60 percent chord.

ESDU-79009 PC**$674.50**
Engineering Sciences Data Unit Ltd., London (England).
Transonic Data Memorandum: Numerical Methods for Solving the Potential Flow Equations for Two-Dimensional Aerofoils in Subsonic and Transonic Flows: Brief Details, Test Cases and Examples.
Data item.
c1975, 40p ISBN-0-85679-271-3
Also pub. as ISSN-0141-4356.
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

The report describes numerical methods for calculating pressure distributions for two-dimensional airfoils in subsonic and transonic potential flow, makes recommendations regarding the use of computer programs of the methods, and presents examples of the pressure distributions obtainable. The results obtained may be used to provide pressure distributions and force and moment coefficients on aerofoil sections for wings and rotors. The research applies to two-dimensional symmetrical and cambered airfoils of between 7% and 15% thickness/chord ratio in potential flow with freestream Mach numbers from zero to near unity.

N80-14045/2 PC **A03/MF A01**
National Aeronautics and Space Administration, Langley Station, VA. Langley Research Center.
Sonic-Boom Wave-Front Shapes and Curvatures Associated with Maneuvering Flight.
R. L. Barger. Dec 79, 30p NASA-TP-1611, L-13339

Sonic-boom wave shapes and caustic lines generated by an airplane performing a general maneuver are studied. The equations are programmed for graphical output as a perspective view of the wave shape. This quasi three-dimensional presentation provides a qualitative insight into the effects of the maneuver on the wave shape and the caustic locations. For the special case of planar maneuvers, the principal curvatures of the wave front are derived. These curvatures are needed to calculate the sound field in the vicinity of a caustic. The results of the analysis are applicable not only to sonic-boom studies but also to the calculation of noise generated by a supersonic rotor or propeller blade tip.

N80-14046/0 PC **A04/MF A01**
National Aeronautics and Space Administration, Langley Station, VA. Langley Research Center.
Aerodynamic Characteristics at Low Reynolds Numbers of Several Heat-Exchanger Configurations for Wind-Tunnel Use.
W. G. Johnson, Jr., and W. B. Igoe. Dec 79, 54p NASA-TM-80188, L-13307

In response to design requirements of the National Transonic Facility, aerodynamic tests were conducted to determine the pressure-drop, flow-uniformity, and turbulence characteristics of various heat-exchanger configurations as a function of Reynolds number. Data were obtained in air with an indraft flow apparatus operated at ambient temperature and pressure. The unit Reynolds number of the tests varied from about 0.06 x 10 to 6th power to about 1.3 x 10 to 6th power per meter. The test models were designed to represent segments of full-scale tube bundles and included bundles of round tubes with plate fins in both staggered and inline tube arrays, round tubes with spiral fins, elliptical tubes with plate fins, and an inline grouping of tubes with segmented fins.

N80-14047/8 PC **A07/MF A01**
Nevada Univ., Las Vegas.
Two Dimensional Aerodynamic Interference Effects on Oscillating Airfoils with Flaps in Ventilated Subsonic Wind Tunnels.
J. Fromme, M. Golberg, and J. Werth. Dec 79, 150p NASA-CR-3210
Grant NSG-2140

The numerical computation of unsteady airloads acting upon thin airfoils with multiple leading and trailing-edge controls in two-dimensional ventilated subsonic wind tunnels is studied. The foundation of the computational method is strengthened with a new and more powerful mathematical existence and convergence theory for solving Cauchy singular integral equations of the first kind, and the method of convergence acceleration by extrapolation to the limit is introduced to analyze airfoils with flaps. New results are presented for steady and unsteady flow, including the effect of acoustic resonance between ventilated wind-tunnel walls and airfoils with oscillating flaps. The computer program TWODI is available for general use and a complete set of instructions is provided.

N80-14048/6 PC A04/MF A01
TRW Defense and Space Systems Group, Redondo Beach, CA.
A Three Dimensional Vortex Wake Model for Missiles at High Angles on Attack.
Final Report.
J. S. Sheffield, and F. D. Deffenbaugh. Jan 80, 59p NASA-CR-3208, TRW-30584-6003-RU-00
Contract NAS2-9579

A three dimensional model for the steady flow past missile and aircraft nose shaped bodies is presented based on augmenting a potential solution with a wake composed of vortex filaments. The vortex positions are determined by the requirement that they, in some sense, align with the flow. The aerodynamic loads on the body are compared with experimental values and used to evaluate the model. The vortex positions compare well with flow visualization results for slender bodies at high angles of attack. The approximations in the wake near the body cause peaks in the force distributions more severe than in the measured values. For given vortex strengths and body attachment points multiple steady vortex positions were not found.

N80-14049/4 PC A05/MF A01
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Effect of Tip Planform on Blade Loading Characteristics for a Two-Bladed Rotor in Hover.
J. D. Ballard, K. L. Orloff, and A. B. Luebs. Nov 79, 89p NASA-TM-78615, A-7939

A laser velocimeter was used to study the flow surrounding a 2.13 m diam. two-bladed, teetering model-scale helicopter rotor operating in the hover condition. The rotor system employed interchangeable blade tips over the outer 25% radius. A conventional rectangular planform and an experimental ogee tip shape were studied. The radial distribution of the blade circulation was obtained by measuring the velocity tangent to a closed rectangular contour around the airfoil section at a number of radial locations. A relationship between local circulation and bound vorticity was invoked to obtain the radial variations in the sectional lifting properties of the blade. The tip vortex-induced velocity was also measured immediately behind the generating blade and immediately before the encounter with the following blade. The mutual influence between blade loading, shed vorticity, and the structure of the encountered vortex are quantified by the results presented and are discussed comparatively for the rectangular and ogee planforms. The experimental loading for the rectangular tip is also compared with predictions of existing rotor analysis.

N80-14052/8 PC A02/MF A01
Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
The Quasi-Vortex-Lattice Method for Wings with Edge Vortex Separation.
Final Report.
J. L. Pao, and E. Lan. Jan 80, 25p NASA-CR-162530, CRINC-FRL-385-1
Grant NSG-1537

The aerodynamic characteristics of wings with leading-edge vortex separation were predicted using a method based on a flow model with free vortex elements which are allowed to merge into a concentrated core. The calculated pressure distribution is more accurate than that predicted by methods with discrete vortex filaments alone. In addition, the computer time is reduced approximately by half.

N80-14053/6 PC A04/MF A01
Old Dominion Univ. Research Foundation, Norfolk, VA.
Theoretical Study of Aerodynamic Characteristics of Wings Having Vortex Flow.
Report, 1 Feb. - 31 Aug. 1978.
C. S. Reddy. Nov 79, 63p NASA-CR-159184
Contract NAS1-14193

The aerodynamic characteristics of slender wings having separation induced vortex flows are investigated by employing three different computer codes--free vortex sheet, quasi vortex lattice, and suction analogy methods. Their capabilities and limitations are examined, and modifications are discussed. Flat wings of different configurations: arrow, delta, and diamond shapes, as well as cambered delta wings, are studied. The effect of notch ratio on the load distributions and the longitudinal characteristics of a family of arrow and diamond wings is explored. The sectional lift coefficients and the accumulated span loadings are determined for an arrow wing and are seen to be unusual in comparison with the attached flow results. The theoretically predicted results are compared with the existing experimental values.

N80-14054/4 PC A09/MF A01
Old Dominion Univ. Research Foundation, Norfolk, VA.
Optimized Aerodynamic Design Process for Subsonic Transport Wing Fitted with Winglets.
J. M. Kuhlman. Dec 79, 184p NASA-CR-159180
Grant NSG-1357

The aerodynamic design of a wind-tunnel model of a wing representative of that of a subsonic jet transport aircraft, fitted with winglets, was performed using two recently developed optimal wing-design computer programs. Both potential flow codes use a vortex lattice representation of the near-field of the aerodynamic surfaces for determination of the required mean camber surfaces for minimum induced drag, and both codes use far-field induced drag minimization procedures to obtain the required spanloads. One code uses a discrete vortex wake model for this far-field drag computation, while the second uses a 2-D advanced panel wake model. Wing camber shapes for the two codes are very similar, but the resulting winglet camber shapes differ widely. Design techniques and considerations for these two wind-tunnel models are detailed, including a description of the necessary modifications of the design geometry to format it for use by a numerically controlled machine for the actual model construction.

N80-14055/1 PC A03/MF A01
National Aeronautics and Space Administration, Langley station, VA. Langley Research Center.
A Computerized Method for Calculating Flutter Characteristics of a System Characterized by Two Degrees of Freedom.
W. A. Stalnaker, and W. F. Hunter. Nov 79, 52p NASA-TM-80153

A formulation is given for calculating flutter frequency and flutter speed for a problem with two degrees of freedom. Two different solutions for evaluating the flutter determinant are presented and the results for each method are compared. A program flow diagram, partial program listing, and a sample problem with input and output for the two different methods are included. Although the method was developed for computing flutter characteristics of a pylon installed in the NASA Langley VSTOL tunnel, it is sufficiently general to solve any flutter system that can be characterized by two degrees of freedom.

N80-14056/9 PC A05/MF A01
Boeing Commercial Airplane Co., Seattle, WA.
An Investigation of Several Factors Involved in a Finite Difference Procedure for Analyzing the Transonic Flow About Harmonically Oscillating Airfoils and Wings.
F. E. Ehlers, J. D. Sebastian, and W. H. Weatherill. May 79, 89p NASA-CR-159143, D6-48852
Contract NAS1-15128

Analytical and empirical studies of a finite difference method for the solution of the transonic flow about harmonically oscillating wings and airfoils are presented. The procedure is based on separating the velocity potential into steady and unsteady parts and linearizing the resulting unsteady equations for small disturbances. Since sinusoidal motion is assumed, the unsteady equation is independent of time. Three finite difference investigations are discussed including a new operator for mesh points with supersonic flow, the effects on relaxation solution convergence of adding a viscosity term to the original differential equation, and an alternate and relatively simple downstream boundary condition. A method is developed which uses a finite difference procedure over a limited inner region and an approximate analytical procedure for the remaining outer region. Two investigations concerned with three-dimensional flow are presented. The first is the development of an oblique coordinate system for swept and tapered wings. The second derives the additional terms required to make row relaxation solutions converge when mixed flow is present. A finite span flutter analysis procedure is described using the two-dimensional unsteady transonic program with a full three-dimensional steady velocity potential.

N80-14059/3 PC A04/MF A01
Poitiers Univ. (France).
Separated Turbulent Flow Behind a Stalled Airfoil Champ d'Ecoulement Decolle Turbulent Derriere UN Profil Decroche.
J. Tensi. 1979, 55p AAAF-NT-79-12, ISBN-2-7170-0539-0
Conf-Presented at 15TH Colloq. D'Aerodyn. Appl., Marseille, 7-9 Nov. 1978. Language in French.

The average and oscillating velocities in separated flow areas capable of generating buffeting in stable profiles were studied in a wind tunnel. The tests were made in an incompressible flow regime on NACA 65.012 and 'Faucille' profiles, one symmetric and the other strongly cambered (for bidimensional flow), and also on a delta wing profile for three dimensional flow. The velocity - distribution charts obtained at an angle of attack of 20 deg are included.

N80-14060/1 PC A02/MF A01
Centre National de la Recherche Scientifique, Meudon-Bellevue (France). Lab. d'Aerothermique.
Study of the Formation of Laminar Flow Separation Induced by the Deflection of a Control Surface Etude de la Formation d'UN Decollement Laminaire Induit Par le Braquage d'Une Gouverne.
M. F. Scibilia, and D. Durox. Feb 79, 16p REPT-79-2, PUBL-598
Language in French.

The laminar flow separation induced by aileron deflection in a rarefied gas medium characterized by a Mach number of 8, Reynolds number of 2200/cm, and simulated flight altitude of 60 km was studied measuring heat transfer and comparing results with previous work under similar conditions. A fixed nul incidence was adopted. The model was nickel plated; the metallic aileron was provided with a electromagnetic deflection system and the wind tunnel tests were done at 50 K temperature and 70 micro torr pressure. The experimental results of heat flow and visualization are in good agreement with the Cheng and Kemp theories.

N80-14142/7 PC A04/MF A01
Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.).
Investigation of the Oscillatory and Flight Behavior of Rotor Systems in Relation with Atmospheric Turbulence Untersuchungen Zum Schwingungs- und Flugverhalten von Hubschraubern Unter Atmosphaerischer Turbulenz.
H. Dahl, and D. Weger. 1979, 72p BMVG-FBWT-79-5
Subm-Sponsored by Bundesmin. Der Verteidigung. Text in German; English Summary.

The effects of stochastic atmospheric disturbances on the performance of various helicopter rotor systems was investigated in order to determine their gust sensitivity. A statistical description of turbulent excitations which permits sufficiently accurate simulation of helicopter oscillatory behavior resulting from gust disturbances was developed. Results show that during low altitude flight and slow speed flight the gust vector distribution over the helicopter is very nonuniform. At any instant therefore, the individual rotor blades are affected by very different gust velocities which leads to different responses of the blades. In conclusion, the investigations pursue the important objective of elaborating and clarifying possibilities for improvement of the flight characteristics of the investigated rotor systems, in so far as the inclusion of special gust reduction systems on helicopters is possible and profitable.

N80-14143/5 PC A03/MF A01
European Space Agency, Paris (France).
Flight Testing of the Buffeting Behavior of Combat Aircraft.
G. Redeker. Feb 79, 44p ESA-TT-523, DFVLR-FB-IB-151-78/6

Tran-Transl. Into English of "Flugversuche Zum Buffeting-Verhalten von Kampfflugzeugen", Rep. Dfvlr-FB-lb-151-78/6. Dfvlr, Brunswick, 18 Dec. 1979.

The flight testing of buffeting behavior in combat aircraft is reviewed. After a description of the buffeting phenomenon and its effects on the pilot and the performance of a combat aircraft, flight testing techniques from several American reports are discussed.

N80-14355/5 PC **A03**/MF **A01**
Wisconsin Univ. - Milwaukee.
Unsteady Flow and Dynamic Response Analyses for Helicopter Rotor Blades.
Final Progress Report, 2 Jan. 1971 - 30 Jun. 1979.
T. Bratanow. Nov 79, 30p NASA-CR-159190
Contract NGR-50-007-001

Research is presented on helicopter rotor blade vibration and on two and three dimensional analyses of unsteady incompressible viscous flow past oscillating helicopter rotor blades. A summary is presented of the two international research collaborations which resulted from the NASA project: the collaboration under the auspices of NATO between the University of Wisconsin-Milwaukee, University of Brussels, Belgium and the Aerodynamics Research Establishment in Goettingen, West Germany, and the collaboration under the auspices of the National Science Foundation between UWM and the University of Hamburg and the Ship Research Establishment in Hamburg, West Germany. A summary is given of the benefits from the NASA project to UWM, the College of Engineering and Applied Science, and the participants on the project.

N80-14368/8 PC **A05**/MF **A01**
Max-Planck-Inst. fuer Stroemungsforschung, Goettingen (Germany, F.R.).
An Investigation of the Fluctuations of the Wall Pressure and the Wall Pressure Gradient Beneath a Turbulent Boundary Layer.
G. Schewe. 1979, 89p MPIS-MITT-68
Text in German; English Summary.

Fluctuations of the wall pressure and wall pressure gradient were investigated in a wind tunnel designed for acoustic measurements. The Reynolds number based on momentum thickness was 1400. It was shown that the diameter of the small transducers developed for these measurements is small enough to resolve the essential structures of turbulence. Correlation measurements of the pressure gradients and visual analysis of the time functions lead to a mean frequency and a mean wave length for characteristic high amplitude structures. The existence of these pressure structures explains the increase in the RMS value with decreasing transucer diameter and the characteristic feature of the probability density distribution. In the power spectrum there are indications of the existence of Tollmien-Schlichting waves.

1B. Aeronautics

AD-A078 531/1 PC **A02**/MF **A01**
Defence Research Information Centre Orpington (England)
A Means of Specifying a Standard Reference Wet Surface for Military Aircraft,
R. W. Sugg. Oct 79, 15p Rept nos. DRIC-BR-70262, S/T-MEMO-1-79

Aircraft specifications which quote stop distances under dry conditions can be misleading since it is the wet case which gives the longer stop distance and may define the length of an operational runway. Trials have shown however, that the wet stop distance can be between 10% and over 100% longer than the dry distance depending on factors such as water depth and surface type. To try and overcome this problem, this paper studies the BCAR method of aircraft certification under wet conditions and the correction of stop distances to a 'standard' using a friction trailer. It concludes there is merit in this well tried method but the 'standard' is unsuitable for military aircraft and the friction trailer should be of the type in service with the RAF. In addition the 'standard' should be related to accident investigation procedures and NATO standards. (Author)

AD-A078 533/7 PC **A04**/MF **A01**
Defence Research Information Centre Orpington (England)
Trials to Compare the Stopping Performance of Three Anti-Skid Systems and to Demonstrate Methods of Determining Aircraft Stop Distances on the Standard Military Reference Wet Surface,
I. Beaty, and R. W. Sugg. Oct 79, 64p Rept nos. DRIC-BR-70264, S/T-MEMO-3-79

The main part of this report is concerned with a trial to determine if there was any difference in the stop distance of a BAC 1-11 aircraft under wet runway conditions when fitted with three different modern anti-skid systems. The test runway was wetted by four water bowsers and the slipperyness of the surface at the time of the aircraft braked runs determined by a Mu-Meter friction trailer. A test with the Mu-Meter during a period of natural rain confirmed the similarity in runway friction between natural and bowser wetting methods. By comparing the aircraft stop distances at the Mu-Meter reading of .6 it was concluded that although the two more modern systems appeared to give the shorter distance, the difference was small and based on insufficient data points to give a high degree of confidence. The aircraft Braking Force Coefficient versus speed and Mu-Meter reading from one of the runs has been used to demonstrate the use of the method recommended in Ref 1 to determine the stop distance on the Standard Military Reference Wet Surface at the weight at which the aircraft was tested. The Appendices contain a method of deciding on the suitability of a test runway for aircraft/Mu-Meter braking trials using National and NATO standards, recommendations on how to conduct the trials and how to determine Mu-Meter speed/friction curves for the test surface. A brief description is given of a trial on a runway with a large amount of standing water. (Author)

AD-A078 613/7 PC **A05**/MF **A01**
National Aeronautics and Space Administration Langley Station VA Langley Research Center
Analytical Investigation of the Landing Dynamics of a Large Airplane with a Load-Control System in the Main Landing Gear.
Technical paper,
John R. McGehee, and Huey D. Carden. Dec 79, 85p NASA-L-13250, NASA-TP-1555

This paper presents the results of an evaluation of an active load-control landing gear computer program (ACOLAG) for predicting the landing dynamics of airplanes with passive and active main gears. ACOLAG was used in an analytical investigation of the landing dynamics of a large airplane with both passive and active main gears. The results of the evaluation of ACOLAG indicate that the program is valid for predicting the landing dynamics of airplanes with both passive and active main gears. The results of the analytical investigation of the landing dynamics of the large airplane show that the active gear reduces airframe-gear forces and airplane motions following initial impact and has the potential for significant reductions in structural fatigue damage relative to that which occurs with the passive gear. (Author)

AD-A078 617/8 PC **A05**/MF **A01**
Federal Aviation Administration Washington DC Office of Management Systems
Current Aviation Statistics: Air Traffic Activity Terminal Area Relationships. Fiscal Years 1977 and 1978.
1979, 100p Rept no. FAA-AMS-220-79-4

Busy hour estimates are obtained from periodic counts of 60 minutes in duration. These counts are made during known high activity periods for each traffic category. From this sample, tower personnel select a count which is representative of daily busy hour activity for each category. The statistical tables in this publication contain traffic estimates for each airport at which an air traffic control tower operated during all of FY 1977 and FY 1978. Provided with peak day and busy hour counts are average day and hour operations computed from the annual operations counts. Measures of peaking characteristics are given by the ratios peak day to average day and busy hour to average hour by individual airport by size group. (Author)

AD-A078 752/3 PC **A10**/MF **A01**
Naval Air Engineering Center Lakehurst NJ Engineering Dept (SI)
Procedure for Certification Tests of Type C Mark 13 Mod 1 Catapults, Flush Deck Nose Gear Launch Equipment, Bridle Arresters, and Jet Blast Deflectors on USS NIMITZ Class Vessels.
Technical rept.,
Robert L. Schollenberger, and Frank E. Valeri. 20 Nov 79, 224p Rept no. NAEC-ENG-7430-REV-C Supersedes report dated 30 Dec 75, AD-A020 093.

This report contains the procedures for shipboard certification testing of Type C Mark 13 Mod 1 steam catapults and associated equipment aboard the CVN 68 class of carriers. Tests include: visual checks, static proof-loads, hydrostatic tests, electrical and hydraulic system tests, steam accumulator tests, instrumentation requirements, and deadload calibration. (Author)

AD-A078 843/0 PC **A02**/MF **A01**
Rand Corp Santa Monica CA
Aircraft Icing During Low-Level Flights.
Interim rept.,
Robert R. Rapp. Nov 79, 18p Rept no. RAND/N-1311-AF
Contract F49620-77-C-0023

The reasons why icing may hinder low and slow flights are presented. A crude measure of the potential of icing near the ground is presented and it is shown that, by this measure, icing may be a serious problem when flying over the higher terrain of central Europe. Some suggestions for improving the measure of icing potential are given. (Author)

NTISUB/E/104-017 PC**$5.00**/MF**$5.00**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Aircraft Accident Report - American Airlines, Inc., DC-10-10, N110AA, Chicago-O'Hare International Airport, Chicago, Illinois, May 25, 1979.
21 Dec 79, 104p NTSB-AAR-79-17
Paper copy available on subscription, North American Continent price $50.00/year; all others write for quote.

About 1504 c.d.t., May 25, 1979, American Airlines, Inc., Flight 191, a McDonnell-Douglas DC-10-10 aircraft, crashed into an open field just short of a trailer park about 4,600 ft northwest of the departure end of runway 32R at Chicago-O'Hare International Airport, Illinois. Flight 191 was taking off from runway 32R. The weather was clear and the visibility was 15 miles. During the takeoff rotation, the left engine and pylon assembly and about 3 ft of the leading edge of the left wing separated from the aircraft and fell to the runway. Flight 191 continued to climb to about 325 ft above the ground and then began to roll to the left. The aircraft continued to roll to the left until the wings were past the vertical position, and during the roll, the aircraft's nose pitched down below the horizon. Flight 191 crashed into the open field and the wreckage scattered into an adjacent trailer park. The aircraft was destroyed in the crash and subsequent fire. Two hundred and seventy-one persons on board Flight 191 were killed; two persons on the ground were killed, and two others were injured. The National Transportation Safety Board determines that the probable cause of this accident was the asymmetrical stall and the ensuing roll of the aircraft, resulting from maintenance-induced damage leading to the separation of the No. 1 engine and pylon assembly at a critical point during takeoff.

N80-14109/6 PC **A03**/MF **A01**
Aerospace Engineering Test Establishment, Cold Lake (Alberta).
Determination of the Repeatability of Pec.
R. D. Michas. 23 Oct 79, 37p AETE-PR-79/36, CF-5

Position error calibrations conducted on four CF-5A, six CF-5 A/R, and five CF-5D aircraft using the standard tower fly by and pacing methods are discussed. The variation in position error, between individual aircraft of each type is examined. Ammendments to the position error correction charts for the CF-5A and CF-5D Aircraft Operation Instruction and redesign of the correction cam are discussed.

N80-14114/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Langley Station, VA. Langley Research Center.
Preliminary Test Results of a Flight Management Algorithm for Fuel Conservative Descents in a Time Based Metered Traffic Environment.
C. E. Knox, and D. G. Cannon. Nov 79, 34p NASA-TM-80194

A flight management algorithm designed to improve the accuracy of delivering the airplane fuel efficiently to a metering fix at a time designated by air traffic control is discussed. The algorithm provides a 3-D path with time control (4-D) for a test B 737 airplane to make an idle thrust, clean configured descent to arrive at the metering fix at a predetermined time, altitude, and airspeed. The descent path is calculated for a constant Mach/airspeed schedule from linear approximations of airplane performance with considerations given for gross weight, wind, and nonstandard pressure and temperature effects. The flight management descent algorithms and the results of the flight tests are discussed.

N80-14139/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Langley Station, VA. Langley Research Center.
Altitude Response of Several Airplanes During Landing Approach.
W. H. Phillips. Nov 79, 39p NASA-TM-80186

The response in altitude and pitching velocity of the shuttle and of four other airplanes during the landing approach is compared. The effects of airplane type, pitch damping, center-of-gravity location, lift coefficient, and cockpit position are presented. The reasons for the differences observed and the effects of these differences on control characteristics are discussed.

PATENT-4 167 735 Not available NTIS
Department of the Navy Washington DC
Aircraft Orientation Determining Means.
Patent,
Bernard L. Lewis. Filed 18 Aug 78, patented 11 Sep 79, 6p AD-D006 781/9, PAT-APPL-934 777 Supersedes PAT-APPL-934 777-78, AD-D005 328.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention concerns a system for measuring, in conjunction with a GCA radar, the crab angle of an aircraft which is making its landing approach above a runway just prior to touchdown. Two doppler radars are placed, one on each side of the runway at equal spacings from the center line of the runway, with their antennas facing each other. The doppler radars function at very nearly the same frequency. The average doppler frequency of the echo received by each radar is determined and the frequencies are substracted from each other. The difference in doppler frequency and the ground velocity of the aircraft are coupled to a computer which solves an equation to provide the value of the crab angle of the aircraft. The result can be radioed to the aircraft so that an adjustment in yaw can be made to zero the crab angle before touch-down.

PB80-910401 PC**$5.00**/MF**$5.00**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Aircraft Accident Report - Air New England, Inc., DeHavilland DHC-6-300, N383 EX, Hyannis, Massachusetts, June 17, 1979.
3 Jan 80, 29p NTSB-AAR-80-1
Paper copy available on subscription, North American Continent price $50.00/year; all others write for quote.

About 2248 e.d.t., on June 17, 1979, Air New England, Inc., Flight 248 crashed into a heavily wooded area about 1.5 nmi northeast of Barnstable Municipal Airport, Hyannis, Massachusetts. The crash occurred during an instrument landing system approach to runway 24 in instrument meteorological conditions. Of the eight passengers and a crew of two aboard, the captain was killed, the first officer and six passengers were injured seriously, and two passengers received minor injuries. The aircraft was destroyed. The National Transportation Safety Board determines that the probable cuase of the accident was the failure of the flightcrew to recognize and react in a timely manner to the gross deviation from acceptable approach parameters, resulting in a continuation of the descent well below decision height during a precision approach without visual contact with the runway environment. Although the Board was unable to determine conclusively the reason for the failure to recognize and react to the gross deviation, it is believed that the degraded physiological condition of the captain seriously impaired his performance.

PB80-911400 Subscription
National Transportation Safety Board, Washington, DC. Bureau of Technology.
Aircraft Accident Reports, Brief Format, U.S. Civil Aviation.
Irregular repts.
1980, Open series
Paper copy available on subscription, North American Continent price $50.00/year; all others write for quote. Single copies also available.

This subscription offers publications presenting aircraft accident reports, in brief formats, occurring in U.S. civil aviation operations during calendar year 1979. The publications are issued irregularly, normally fifteen times each year. The brief format presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additional statistical information is tabulated by injury index, injuries, and causal factors. A supplemental issue released as the final publication for the year, contains additional statistical tables for all accident records during the year.

PB80-911401 PC**$10.00**
National Transportation Safety Board, Washington, DC. Bureau of Technology.
Aircraft Accident Reports - Brief Format, U.S. Civil Aviation, Issue Number 4 of 1979 Accidents.
4 Jan 80, 170p NTSB-BA-80-1
Paper copy available on subscription, North American Continent price $50.00/year; all others write for quote.

This publication contains selected aircraft accident reports, in brief format, occurring in U.S. civil aviation operations during calendar year 1979. The 300 General Aviation accidents contained in this publication represent a random selection. This publication is issued irregularly, normally fifteen times each year. The brief format presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additional statistical information is tabulated by injury index, injuries, and causal factors.

1C. Aircraft

AD-A078 291/2 MF **A01**
Human Engineering Lab Aberdeen Proving Ground MD
A Study of the Canopy Design for the Advanced Attack Helicopter by Use of Computer Graphics.
Final technical rept.,
Christopher C. Smyth. Aug 79, 137p Rept no. HEL-TM-13-79
Availability: Microfiche copies only.

A package of computer programs has been developed for use in helicopter canopy design. The programs compute point-wise measures of three important design factors for the transparent surfaces of an attack helicopter canopy. These factors are: (1) the internal glare; (2) the external glint; and (3) the optical distortions exhibited by the canopy design. The programs have been applied to modifications in the present canopy design on the YAH-64 Advanced Attack Helicopter. The results suggest that reduced internal glare is possible with slight additional glint and distortion by displacing the side windows 4 inches from the plane of the frame vertices and rotating the axis of curvature of the top window by 90 degrees and displacing it 1.5 inches.

AD-A078 298/7 PC **A04**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB Oh School of Engineering
Aircraft Airframe Cost Estimation Using a Random Coefficients Model.
Master's thesis,
James H. Hinch. Dec 79, 65p Rept no. AFIT/GOR/SM/79D-4

Previous studies into aircraft airframe acquisition costs have either not dealt with the learning phenomenon or have assumed that the learning curve slope is the same for all types of aircraft. However, some results have indicated that this is not truly the case. The random coefficients model, as applied in this study, provides a framework in which the slopes can differ by estimating their values based on other characteristics of the aircraft. This method thus has the advantage over other techniques of being able to predict the actual learning curve slope more accurately before any production takes place, and thus yield more reliable cost estimates. For that reason, it represents a significant advance in the state of the art of parametric airframe cost estimation. (Author)

AD-A078 340/7 PC **A03**/MF **A01**
Army Aviation Engineering Flight Activity Edwards AFB CA
Preliminary Airworthiness Evaluation, AH-1G with the Airborne Target Acquisition Fire Control System and the HELLFIRE Modular Missile System Installed.
Final rept. Jun 78-Jan 79,
Patrick J. Moe. Jul 79, 43p Rept no. USAAEFA-78-02

The AH-1G helicopter with the HELLFIRE modular Missile System (HMMS) and the Airborne Target Acquisition Fire Control System (ATAFCS) is being used as a surrogate trainer for the YAH-64 helicopter. The United States Army Aviation Engineering Flight Activity was tasked to provide quantitative and qualitative data on the handling qualities of the helicopter, obtain limited level flight performance data, and obtain limited handling qualities of the helicopter with only the ATAFCS installed. The test helicopter was a production AH-1G helicopter (212 tail rotor) modified with an ATAFCS mockup and carrying eight HELLFIRE missiles. Six productive flight test hours were flown in six flights. No shortcomings or deficiencies attributable to HMMS and ATAFCS installation were found. The AH-1G helicopter, with HMMS and ATAFCS installed, exhibits an additional equivalent flat plate area of 4.0 ft2 compared to the standard AH-1Q helicopter. The handling qualities of the helicopter with only the ATAFCS installed are essentially the same as the production AH-1G helicopter. (Author)

AD-A078 437/1 PC **A03**/MF **A01**
Von Karman Inst for Fluid Dynamics Rhode-Saint-Genese (Belgium)
An Experimental Study of the Noise Generated by a Pusher Propeller due to a Wake Entering the Propeller Disc.
Final rept. 1 Nov 78-31 Oct 79,
W. Herkes. 5 Nov 79, 39p VKI-1979-17, EOARD-TR-80-5
Grant AFOSR-79-0033

An experimental investigation of the noise generated by a pusher propeller due to a wake entering the propeller disc was conducted. Acoustic measurements were made in a low speed wind tunnel with the propeller operating in a uniform velocity airstream, and with a wind mounted at various locations upstream of the propeller. For the propeller alone case the experimental results were compared with theoretical results. (Author)

AD-A078 476/9 PC **A09**/MF **A01**
Army Aviation Engineering Flight Activity Edwards AFB CA
Preliminary Airworthiness Evaluation UH-1H Helicopter Equipped with Multiple Target Electronic Warfare System (MULTEWS).
Final rept. 13 Aug-2 Dec 77,
Vernon L. Diekmann, Sherwood C. Spring, Mathews S. Mathews, III, John F. Hagen, and John S. Tulloch. May 78, 187p Rept no. USAAEFA-77-09

The United States Army Aviation Engineering Flight Activity conducted a Preliminary Airworthiness Evaluation (PAE) of a UH-1H helicopter equipped with a Multiple Target Electronic Warfare System (MULTEWS) from 13 August through 2 De-

cember 1977. The evaluation was conducted at Edwards Air Force Base, California, and required 45 flights for a total productive flight time of 41 hours. The test program was terminated when the test aircraft sustained major damage during height-velocity testing. The addition of the MULTEWS equipment to the UH-1H airframe caused significant degradation in performance and handling qualities. Changes in the operator's manual should be made to reflect the changes in performance for MULTEWS configured aircraft. The MULTEWS installation also generally degraded the vibration characteristics of the UH-1H, increased structural loads, increased the maintenance workload, and degraded aircraft crashworthiness. The degradation in performance and handling qualities as well as the excessive vibrations and structural loads in the MULTEWS configured aircraft were attributed to the extremely high drag and turbulent wake of the externally mounted MULTEWS components.

AD-A078 536/0 PC **A11/MF A01**
Office National D'Etudes Et de Recherches Aerospatiales Chatillon-Sous-Bagneux (France)
Conference on Certification of Aircraft for Lightning and Atmospheric Electricity Hazards (Conference sur la Certification des Aeronefs Contre les Dangers du Foudroiement et de L'Electricite Atmospherique) held ONERA - Chatillon (France) 14-21 September 1978.
Final rept. 1 Jul 78-30 Jun 79,
Joseph Taillet. 30 Jul 79, 230p EOARD-TR-79-6
Grant AFOSR-78-3653

This conference was organized to disseminate in a tutorial fashion to the NATO Air Electrical Working Party and their technical advisors the information related to the recent progress of atmospheric electricity hazards and lightning protection studies. The conference program covers the following topics: Theory of Lightning; Basis of Specification; Lightning Attachment and Swept Stroke Testing; Fuel Vapor Ignition and Direct Effects Testing; Indirect Effects Testing and Lightning Protection Methodology; Static Electricity. (Author)

AD-A078 629/3 PC **A11/MF A01**
Vought Corp Dallas TX
Power System Control Study. Phase I - Integrated Control Techniques.
Interim rept. 1 Jul 78-15 Jun 79,
D. E. Lautner, A. J. Marek, and J. R. Perkins. Jun 79, 240p AFAPL-TR-79-2084
Contract F33615-78-C-2018

This report documents the Phase I results of a two phase study program which addresses the integration of advanced power system control technologies into a reliable and fault tolerant system. The advanced control technologies integrated include electric engine start, automatic load management, microprocessor control implementations, design techniques for providing 'no-gap' power and an all 'solid state' electric power distribution system. Electric system performance requirements are established and preliminary designs of an integrated 'baseline' control system for single and multiengine aircraft for the 1990 operational time period are presented. Finally, stability analysis requirements and procedures are established for each of the two designs. During Phase II, detail design of the power control system will be completed and a stability analysis will be conducted. (Author)

AD-A078 635/0 PC **A03/MF A01**
Aeronautical Research Labs Melbourne (Australia)
Sea King Mk. 50 Helicopter Flight Control System. A Mathematical Model of the AFCS (Autostabilizer/Autopilot Mode).
Aerodynamics note,
Christopher R. Guy. Feb 79, 28p Rept no. ARL/AERO NOTE-387

A mathematical model for the autostabilizer/autopilot mode of the automatic flight control system (AFCS) for the Sea King Mk.50 helicopter is presented. An outline of the autostabilizer/autopilot used in the aircraft is given first, followed by a description of the mathematical model, which includes a representation of each major element of the aircraft system. (Author)

AD-A078 637/6 PC **A03/MF A01**
Aeronautical Research Labs Melbourne (Australia)
A Summary of Damage Tolerance Specifications with Emphasis on Materials and NDI Requirements.
Materials note,
J. Q. Clayton. Feb 79, 26p Rept no. ARL/MAT. 126

Specifications for USAF military aircraft now include damage tolerance and durability as basic structural requirements. The introduction of these requirements into the design and development of future aircraft is briefly described. The new design analysis assumes the existence of flaws in the structure and considers their growth, at calculable rates, by appropriate cracking processes. Non-destructive inspection (NDI) intervals are then specified according to limits of safe crack growth. Airframe rework and repair requirements are similarly established for a period greater than the design life. Details of damage tolerance requirements, including flaw size assumptions, NDI intervals, etc., are summarized and illustrated. Under the new requirements, many existing aircraft are considered to be of uncertain structural integrity. The USAF is currently assessing damage tolerance and durability on a wide range of service aircraft. Application of the new requirements and methods of assessing damage tolerance in operational aircraft are described. (Author)

AD-A078 639/2 PC **A03/MF A01**
Aeronautical Research Labs Melbourne (Australia)
The Fracture of a Parachute Hook: A Case Study of the Role of Materials Parameters in Reliability Analysis.
Materials note,
L. R. F. Rose, and B. J. Wicks. Jul 79, 33p Rept no. ARL/MAT. 125

A detailed analysis of the risk of failure for the particular case of a parachute hook is used to illustrate what information is required for that purpose, how much of it is readily available, and in what areas further research is needed. The analysis relies on the use of a full-scale test to identify the mode of failure and hence the relevant strength parameter. It is concluded that an important role of materials research is to provide an understanding of the factors which can affect mechanical properties, so that the characteristics of the relevant population of structures or components may be more precisely defined, and the variability in strength which can be expected in service may be estimated. A number of topics for further research are discussed, but the practical value of this research will depend on the precision of the results obtained and this cannot be determined beforehand. (Author)

AD-A078 643/4 PC **A03/MF A01**
National Aeronautics and Space Administration Langley Station VA Langley Research Center
Effect of Noise Spectra and a Listening Task Upon Passenger Annoyance in a Helicopter Interior Noise Environment.
Technical paper,
Sherman A. Clevenson, and Jack D. Leatherwood. Dec 79, 26p NASA-L-13233, NASA-TP-1590

A laboratory study was conducted to determine the effects of helicopter interior noise on passenger annoyance. Bothe reverie and listening situations were studied as well as the relative effectiveness of several descriptors (i.e., overall sound pressure level, A-weighted sound pressure level, and speech interference level) for quantifying annoyance response for these situations. The noise stimuli were based upon recordings of the interior noise of the NASA Civil Helicopter Research Aircraft. These noises were presented at levels ranging from approximately 68 to 86 dB(A) with various gear clash tones selectively attenuated to give a range of spectra. The listening tasks required the subjects to listen to and record phonetically balanced words presented within the various noise environments. Results indicate that annoyance during a listening condition is generally higher than annoyance during a reverie condition for corresponding interior noise environments. Attenuation of the planetary gear clash tone results in increases in listening performance but has negligible effect upon annoyance for a given noise level. The noise descriptor most effective for estimating annoyance response under conditions of reverie and listening situations is shown to be the A-weighted sound pressure level. (Author)

AD-A078 644/2 PC **A04/MF A01**
National Aeronautics and Space Administration Langley Station VA Langley Research Center
Effects of Fuselage Forebody Geometry on Low-Speed Lateral-Directional Characteristics of Twin-Tail Fighter Model at High Angles of Attack.
Technical paper,
Peter C. Carr, and William P. Gilbert . Dec 79, 73p NASA-L-13270, NASA-TP-1592

Low-speed, static wind-tunnel tests have been conducted to explore the effects of fighter fuselage forebody geometry on lateral-directional characteristics at high angles of attack and to provide data for general design procedures. Effects of eight different forebody configurations and several add-on devices (e.g., nose strakes, boundary-layer trip wires, and nose booms) were investigated. Tests showed that forebody design features such as fineness ratio, cross-sectional shape, and add-on devices can have a significant influence on both lateral-directional and longitudinal aerodynamic stability. Several of the forebodies produced both lateral-directional symmetry and strong favorable changes in lateral-directional stability. However, the same results also indicated that such forebody designs can produce significant reductions in longitudinal stability near maximum lift and can significantly change the influence of other configuration variables. The addition of devices to highly tailored forebody designs also can significantly degrade the stability improvements provided by the clean forebody. (Author)

AD-A078 645/9 PC **A03/MF A01**
National Aeronautics and Space Administration Langley Station VA Langley Research Center
Aerothermal Performance of a Radiatively and Actively Cooled Panel at Mach 6.6.
Technical paper,
Charles P. Shore, and Irving Weinstein. Dec 79, 42p NASA-L-13355, NASA-TP-1595

A flight-weight radiative and actively cooled honeycomb sandwich panel (RACP was subjected to multiple cycles of both radiant and aerothermal heating. The 0.61-m (2 ft) by 1.22-m (4 ft) test specimen incorporated essential features of a full-scale 0.61-m (2 ft) by 6.10-m (20 ft) RACP designed to withstand a heat flux of 136 kW/m2 (12 Btu/sq. ft-sec). The panel consisted of Rene 41 heat shields, a thin layer of high-temperature insulation, and an aluminum honeycomb sandwich panel with coolant tubes next to the sandwich skin. A 60/40 mass solution of ethylene glycol/water was used to cool the panel which successfully withstood a total of 3.5 hr of radiant heating and 137 sec exposure to an M = 6.6 test stream. Heat-shield temperatures reached 1080 K (1945 R), and cooled-panel temperatures reached 382 K (687 R) midway between coolant tubes. Simulation of the full-scale panel indicated that the full-scale RACP would perform as expected. The tests revealed no evidence of coolant leadkage or hot-gas ingress which would seriously degrade the RACP performance. (Author)

AD-A078 671/5 PC **A02/MF A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
Propulsion and Engergetics Panel Working Group 11 on Aircraft Fire Safety. Volume 1. Executive Summary.
Advisory rept.,
B. P. Botteri. Sep 79, 19p Rept no. AGARD-AR-132-VOL-1

In 1976, the Propulsion and Energetics Panel of AGARD set up its Working Group 11 on 'Aircraft Fire Safety'. The findings and recommendations of Working Group 11 are collected in this Executive Summary which forms Volume 1 of the final Advisory Report of the Working Group. Volume 2 of the same publication contains the full report of the Working Group. Besides the various recommendations on technical and operational subjects a strong proposal is included for an international cooperative effort in the field of aircraft fire safety.

AD-A078 672/3 PC **A08/MF A01**
Air Force Flight Dynamics Lab Wright-Patterson AFB OH

Digital Computer Solution of Aircraft Longitudinal and Lateral - Directional Dynamic Characteristics.
Final technical rept.,
John M. Griffin, Robert B. Yeager, Larry B. Jordan, and David A. Ratino. Jul 79, 173p Rept no. AFFDL-TR-78-203
Revision of report dated Dec 67, SEG-TR-66-52.

Two Fortran IV computer programs are presented for the solution of aircraft longitudinal and lateral-directional transfer function factors and dynamic characteristics. The longitudinal program solves for the three-degree-of-freedom dynamic characteristics (phugoid damping ratio and natural frequency, short period damping ratio and natural frequency, etc.) and the numerator factors of the alpha, u, theta, h, and vertical acceleration transfer functions. The lateral-directional program solves for the three-degree-of-freedom characteristics (Dutch roll damping ratio and natural frequency, roll and spiral mode time constants, etc.) and the numerator factors of the beta, phi, y, and lateral acceleration transfer functions. In addition, some time histories and specialized handling qualities parameters can be computed and printed out. The equations and their underlying assumptions are discussed. The two complete computer programs are shown, and the input, output, and program functions are discussed. (Author)

AD-A078 673/1 PC **A10**/MF **A01**
Douglas Aircraft Co Long Beach CA
Evaluation of Aircraft Windshield Materials in a Simulated Supersonic Flight Environment.
Final rept. May 78-Mar 79,
J. B. Hoffman. Jun 79, 203p MDC-J7186, AFFDL-TR-79-3058
Contract F33615-75-C-3105
See also Rept. no. AEDC-TSR-78-V33, AD-B032 421.

A series of wind tunnel tests were conducted at Mach 2.4, 2.6 and 3.0 to determine material survivability and optical clarity for a variety of small, flat laminated and monolithic specimens of acrylic, urethane, glass, silicone and polycarbonate materials for potential use in the design of Mach 3.0 aircraft windshields. Twenty-seven specimens were tested to determine the material limitations and capabilities, which included an investigation of specific edge designs and the effect of edge structure on temperature distribution. The tests were conducted in a Mach 6 wind tunnel which utilized a shock generator to reduce the air stream to the desired flow across the outer surface of the specimens. The specimens were individually mounted in a pressurized box to provide a simulated cabin environment on their inner surface. Grid line photography was used to delineate inflight and permanent optical distortion. Material damage was evaluated and thermal gradients were documented. Prior to this test program, the aerodynamic effect of a Mach 2.4 through Mach 3.0 flight environment on transparent plastic and interlayer materials was unknown. The survival of these specimens demonstrated that laminated configurations consisting of acrylic/silicone/polycarbonate or urethane/urethane/polycarbonate, as well as glass/silicone/polycarbonate are viable candidates for aircraft windshields that would be exposed to a Mach 3.0 flight environment for short exposures.

AD-A078 677/2 PC **A03**/MF **A01**
Arnold Engineering Development Center Arnold Afs TN
Aerodynamic Characteristics and Store Loads of the 1/24-Scale F-111 Aircraft Model with External Store Loadings.
Final rept.,
C. F. Anderson. Aug 79, 48p Rept no. AEDC-TSR-79-P48
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

The 1/24-scale F-111 aircraft model was tested to obtain simultaneous measurements of the aircraft and store aerodynamic loads and to evaluate the effects of the TAWDS pod on aircraft stability and control. Static stability and store loads data were obtained at 5 wing sweep angles for Mach numbers from 0.4 to 1.2. Data were also obtained for stabilizer deflections of + or - 10 deg and with the speed brake deflected 50 deg for some configurations. The angle of attack range was from -2 to 24 deg and the angle of sideslip range was from -10 to 10 deg.

AD-A078 683/0 PC **A14**/MF **A01**
Nielsen Engineering and Research Inc Mountain View CA
The Development of Rapid Predictive Methods for Three-Dimensional Transonic Flow Fields About Fighter Bomber Aircraft. Part I.
Final rept. 1 Jan 75-30 Sep 79,
Anthony J. Crisalli, Stephen S. Stahara, Jack N. Nielsen, and John R. Spreiter. Jul 79, 305p NEAR-TR-198, AFOSR-TR-79-1281
Contract F44620-75-C-0047

This report presents an overall account of the progress made on an essential component of the transonic store trajectory problem: the predicton of transonic flow fields about wing-body/pylon combinations representative of modern fighter-bomber aircraft. The emphasis here is on the development of predictive techniques which are sufficiently economical from the standpoint of computer cost to enable an aircraft designer to employ the techniques over a wide range of Mach number, angle of attack, and geometric parameters. The report presents several candidate transonic predictive methods and evaluates them by comparing their predictions of various flow field quantities with experimental data. The experimental data are taken from a parallel wind-tunnel test phase of the project, designed specifically for evaluating the predictive methods. The experimental data have been documented and archived in several test reports. The extensive comparisons of the theoretical predictions from the various predictive methods with the data comprise the major portion of this report.

AD-A078 693/9 PC **A10**/MF **A01**
Arnold Engineering Development Center Arnold AFS TN
An Investigation of F-16 Nozzle-Afterbody Forces at Transonic Mach Numbers with Emphasis on Support System Interference.
Final rept. Jan-Jul 78,
Earl A. Price, Jr. Dec 79, 209p AEDC-TR-79-56, AFAPL-TR-79-2099
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

A comprehensive experimental program was conducted to provide nozzle-afterbody data with a minimum interference support system on a 1/9-scale F-16 model and to determine the interference induced on the afterbody-nozzle region by a sting, a wingtip, and a strut model support system. The investigation was conducted over the Mach number range from 0.6 to 1.5 and at angles of attack from 0 to 9 deg. Interference was evaluated by comparison of nozzle-afterboy axial and normal forces obtained from integrating pressure data. The results include parametric studies of the efects of various components of the wingtip support system (i.e., the support blade axial position, wingtip boom diameter, boom spacing, and boom-tip axial location). High-pressure air at ambient temperature was utilized for exhaust plume simulation. The results indicate that a sting support passing through the nozzle with the jet effects simulated by an annular jet appears to offer a minimum interference support system for the type of nozzle-afterbody test described in this report.

AD-A078 735/8 PC **A20**/MF **A01**
Air Force Flight Dynamics Lab Wright-Patterson AFB OH
Transient Thermal Effects in Disc Brakes.
Final rept. Aug 77-Jul 79,
Ben J. Brookman, Jr. Nov 79, 465p Rept no. AFFDL-TR-79-3112

An investigation was undertaken with the ultimate objective being to develop a general theoretical model for predicting temperatures within the stators, rotors, rim, torque tube, tire, fuse plug and bead seat of a typical disc brake assembly. The effort was divided into four phases: (1) Temperature Measurement Analysis, (2) Theoretical Analysis of Brake and Component Parts, (3) Full Scale Brake Tests, and (4) Correlation of Results.

AD-A078 782/0 PC **A03**/MF **A01**
Mcdonnell Douglas Research Labs St Louis MO
Viscous Flowfields Induced by Two- and Three-Dimensional Lift Jets in Ground Effect.
Final technical rept. 1 Feb 76-28 Feb 79,
W. W. Bower, R. K. Agarwal, G. R. Peters, and D. R. Kotansky. 1 Mar 79, 38p ONR-CR215-246-3F
Contract N00014-76-C-0494

An important consideration for VTOL aircraft design is the aerodynamic interaction between airframe undersurfaces and the ground. In an effort to predict this phenomenon, a second-order-accurate, finite-difference scheme for solution of the two- and three-dimensional conservation equations of fluid mechanics, in combination with a turbulence model, is described. The solution technique is applied to a planar lift jet in ground effect for both incompressible and compressible flow and to two interacting incompressible jets with fountain formation. Fluid properties that characterize the jet impingement flowfields are given for a range of Reynolds numbers, and comparisons with measured data are presented. (Author)

AD-A078 802/6 PC **A03**/MF **A01**
United Technologies Corp Stratford CT Sikorsky Aircraft Div
NADC ABC Rotor Maps.
Final rept.,
David T. Balsh. 29 Jun 79, 32p Rept no. SER-69060
Contract N62269-79-M-3221

This report is the formal documentation of the rotor performance maps and includes a description of the anticipated 1995 IOC rotor configuration on which the rotor maps are based and substantiation for the methodology used in the generation of the maps. The rotor maps themselves are presented in the appendix of this report in both HESCOMP transcript sheet form and in computer input code form, (the latter is a copy of the listing obtained from a set of punched computer cards which will have been presented to NAVAIRDEVCEN.)

AD-A078 825/7 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD Aviation and Surface Effects Dept
Experimental Investigation of a Circulation Control Aileron.
Final rept. Oct 77-Sep 78,
Steven W. Prince. Jul 79, 28p Rept no. DTNSRDC/ASED-79/08

A Circulation Control (CC) aileron was tested on a semispan wing-fuselage model at a dynamic pressure equal to 20 lb/sq ft (957 N/sq m) and a Reynolds number of 0.8 million per ft (2.62 million per m). Three different trailing edge geometries were used on CC ailerons of 10 and 20 percent of the half span. Blowing was controlled to produce jet momentum coefficients from 0.0017 to 0.0124. Rolling moment coefficients as high as 0.035 were recorded for the 20-percent CC aileron for angles of attack between 0 and 12 deg. The CC aileron was at least three times as effective as a pure reaction jet for the same amount of bleed air. Adverse yaw was large, on the order of one-half of the rolling moment. (Author)

AD-A078 909/9 PC **A20**/MF **A01**
Naval Postgraduate School Monterey CA
Proceedings of a Workshop on V/STOL Aircraft Aerodynamics. Volume II. Held At Naval Postgraduate Schoo! Monterey, California, May 16-18, 1979,
C. Henderson, and M. F. Platzer. 18 May 79, 472p
Errata sheet inserted.

Contents: Propulsion System/Airframe Interactions--Recent Applications of Theoretical Analysis to V/STOL Inlet Design, Inlet Operating Characteristics at High Angles of Attack, Low Speed Development of the Supersonic XFV-12A V/STOL Inlet, Subsonic VTOL Inlet Experimental Results, Inlet Ram Forces and Moments and V/STOL Aircraft, Theoretical Fan Velocity Distortions Due to Inlets and Nozzles, Aerodynamics of a Tilt-Nacelle V/STOL Propulsion System, Isolated Deflector Nozzle Static Tests for V/STOL Aircraft; V/STOL Aircraft Configurational Considerations and Developments--High Angle of Attack Aerodynamics at DTNSRDC, Development of High Lift Devices for Application to Advanced Navy Aircraft, YC-14 Low Speed Test Techniques, Vectored-Engine-Over-Wing Concept Development, Wind Tunnel Investi-

gation of a Highly Maneuverable Supersonic V/STOL Fighter, Transition Characteristics of the External-Augmentor V/STOL Aircraft Concept, Calculation of Forces and Moments Acting on an Augmentor Wing for a VTOL Fighter in Hover or Transition Flight, Aerodynamics of an Advanced Jet Flap and an Ultra-STOL Application, and High Speed Aerodynamic Technology for V/STOL Fighter Attack Aircraft.

AD-A078 957/8 PC **A06**/MF **A01**
Von Karman Inst for Fluid Dynamics Rhode-Saint-Genese (Belgium)
Variation of Spanwise Circulation across an Aircraft Fuselage: Pressure Measurements for a Body of Revolution in the Presence of a Lifting Wing.
Final scientific rept. 1 Apr 79-31 Mar 80,
R. Dowgwillo. 12 Oct 79, 107p VKI-1979-22, EOARD-TR-80-4
Grant AFOSR-79-0099

An experimental study of the load characteristics of a separated wing and body model was carried out in the VKI low speed wind tunnel. Measurements of the pressure distribution on the model were made for different wing pitch angles and wing-body gap heights. The body pitch angle was zero. Derived data consist of body chordwise and spanwise lift distributions, wing spanwise lift distribution and wing pitching moment distribution. Results show that the body always develops negative lift in the presence of the wing. Wing and body spanwise lift distribution magnitude are monotonically decreasing from centerline to wing root, but their distribution curve shapes are different. When the wing-body gap is filled, the spanwise lift distribution for the resultant configuration shows the lift increasing from wing root to centerline, a result considered typical of a high-mounted wing. (Author)

AD-A078 973/5 PC **A05**/MF **A01**
Air Force Flight Dynamics Lab Wright-Patterson AFB OH
Air Force Flight Dynamics Laboratory Fiscal Year 1981. Technical Objective Document.
Dec 79, 86p Rept no. AFFDL-TR-79-3133
Supersedes rept. no. AFFDL-TR-78-181, AD-A063 384.

The document presents an overview of the four Technical Planning Objectives (TPO) and supporting data for each. These are extracted from the technical plan of the Air Force Flight Dynamics Laboratory (AFFDL). Information is largely based on AFFDL fiscal 1981 technology plan omitting specific funding and timing information of an 'Official Use Only' nature. Technical objectives are described for the technical areas of Structures and Dynamics, Vehicle Equipment/Subsystems, Flight Control and Aeromechanics. Points of contact for more information in each of the areas are identified. (Author)

N80-14110/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Langley Station, VA. Langley Research Center.
Wind-Tunnel Investigation of the Flow Correction for a Model-Mounted Angle of Attack Sensor at Angles of Attack from -10 Deg to 110 Deg.
T. M. Moul. Nov 79, 20p NASA-TM-80189

A preliminary wind tunnel investigation was undertaken to determine the flow correction for a vane angle of attack sensor over an angle of attack range from -10 deg to 110 deg. The sensor was mounted ahead of the wing on a 1/5 scale model of a general aviation airplane. It was shown that the flow correction was substantial, reaching about 15 deg at an angle of attack of 90 deg. The flow correction was found to increase as the sensor was moved closer to the wing or closer to the fuselage. The experimentally determined slope of the flow correction versus the measured angle of attack below the stall angle of attack agreed closely with the slope of flight data from a similar full scale airplane.

N80-14115/3 PC **A05**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
Quiet Clean Short-Haul Experimental Engine (Qcsee) Acoustic and Aerodynamic Tests on a Scale Model over-the-Wing Thrust Reverser and Forward Thrust Nozzle.
D. L. Stimpert. 18 Jan 78, 85p NASA-CR-135254, R75AEG504
Contract NAS3-18021

An acoustic and aerodynamic test program was conducted on a 1/6.25 scale model of the Quiet, Clean, Short-Haul Experimental Engine (QCSEE) forward thrust over-the-wing (OTW) nozzle and OTW thrust reverser. In reverse thrust, the effect of reverser geometry was studied by parametric variations in blocker spacing, blocker height, lip angle, and lip length. Forward thrust nozzle tests determined the jet noise levels of the cruise and takeoff nozzles, the effect of opening side doors to achieve takeoff thrust, and scrubbing noise of the cruise and takeoff jet on a simulated wing surface. Velocity profiles are presented for both forward and reverse thrust nozzles. An estimate of the reverse thrust was made utilizing the measured centerline turning angle.

N80-14117/9 PC **A04**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
Quiet, Clean, Short-Haul, Experimental Engine (Qcsee) under-the-Wing (Utw) Engine Acoustic Design.
H. D. Sowers, and W. E. Coward. Jan 78, 62p NASA-CR-135267, R76AEG195
Contract NAS3-18021

The acoustic considerations involved in the low source noise basic engine design and the design procedures followed in the development of the under-the-wing (UTW) engine boilerplate and composite nacelle acoustic treatment designs are presented. Laboratory experiments, component tests, and scale model and engine tests supporting the UTW engine acoustic design are referenced. Acoustic design features include a near-sonic inlet, low fan and core pressure ratios, low fan tip speed, high and low frequency stacked core treatment, multiple thickness treatment, and fan frame and stator vane treatment.

N80-14118/7 PC **A04**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
Quiet, Clean, Short-Haul Experimental Engine (Qcsee) over-the-Wing (Otw) Engine Acoustic Design.
H. D. Sowers, and W. E. Coward. Jun 78, 58p NASA-CR-135268, R76AEG228
Contract NAS3-18021

The acoustic considerations involved in the low source noise basic engine design and the design procedures followed in the development of the over-the-wing (OTW) nacelle acoustic treatment design are presented. Laboratory experiments, component tests, and scale model and engine tests supporting the OTW engine acoustic design are referenced. Acoustic design features include a near-sonic inlet, low fan and core pressure ratios, low fan tip speed, high and low frequency stacked core treatment, multiple thickness treatment, and fan frame and stator vane treatment.

N80-14135/1 PC **A06**/MF **A01**
Institut National des Sciences Appliquees, Lyon (France). Lab. de Mecanique de Structures.
On the Use of Vibration Self-Damping Materials in the Manufacture of Parts for Rotating Machinery Utilisation des Materiaux Amortissants pour la Realisation d'Elements de Machine Tournante.
Final Report.
M. Lalanne, P. Trompette, D. Jones, J. Derhagopian, and A. Hommeida. Oct 77, 124p
Contract DGRST-75-7-0968
Language in French.

The control of structural vibration in rotating pieces in the 400C to 600C temperature range by the utilization of damping materials was studied. The test facilities and measuring systems developed for this study are described, including the high temperature measurement of complex modes and frequencies. A computing method for rotating structures with structural damping which was developed in this study is presented, and applied to real cases, such as a stator vane (three dimensional behavior) and a motor element (axisymmetrical structure).

N80-14136/9 PC **A11**/MF **A01**
National Aeronautics and Space Administration, Langley Station, VA. Langley Research Center.
Simulator Study of Stall/Post-Stall Characteristics of a Fighter Airplane with Relaxed Longitudinal Static Stability.
L. T. Nguyen, M. E. Ogburn, W. P. Gilbert, K. S. Kibler, and P. W. Brown. Dec 79, 226p NASA-TP-1538, L-12854

A real-time piloted simulation was conducted to evaluate the high-angle-of-attack characteristics of a fighter configuration based on wind-tunnel testing of the F-16, with particular emphasis on the effects of various levels of relaxed longitudinal static stability. The aerodynamic data used in the simulation was conducted on the Langley differential maneuvering simulator, and the evaluation involved representative low-speed combat maneuvering. Results of the investigation show that the airplane with the basic control system was resistant to the classical yaw departure; however, it was susceptible to pitch departures induced by inertia coupling during rapid, large-amplitude rolls at low airspeed. The airplane also exhibited a deep-stall trim which could be flown into and from which it was difficult to recover. Control-system modifications were developed which greatly decreased the airplane susceptibility to the inertia-coupling departure and which provided a reliable means for recovering from the deep stall.

N80-14359/7 PC **A02**/MF **A01**
Bionetics Corp., Hampton, VA.
The Transfer of Carbon Fibers Through a Commercial Aircraft Water Separator and Air Cleaner.
J. A. Meyers. Nov 79, 22p NASA-CR-159183
Contract NAS1-15238

The fraction of carbon fibers passing through a water separator and an air filter was determined in order to estimate the proportion of fibers outside a closed aircraft that are transmitted to the electronics through the air conditioning system. When both devices were used together and only fibers 3 mm or larger were considered, a transfer function of .001 was obtained.

N80-14413/2 PC **A03**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
Flight Simulation Fatigue Tests on Lugs with Holes Expanded According to the Split-Sleeve Cold Work Method.
J. Schijve, F. A. Jacobs, and A. E. Meulman. 21 Nov 78, 50p NLR-TR-78131-U, ICAF-1104

Flight simulation tests were performed on 2024-T3 and 7075-T6 lug specimens. Geometrical distortions induced by the expansion were measured. The significance of residual stresses was analysed with reference to depth of penetration of cold work, the relaxation of residual stress by cyclic loads, and other practical aspects. The results indicated that significant fatigue life improvements were obtained with the split-sleeve method.

N80-14422/3 PC **A08**/MF **A01**
Laboratorium fuer Betriebsfestigkeit, Darmstadt (Germany, F.R.).
Review of Investigations into Aeronautics Related Fatigue Federal Republic of Germany.
Status Report, May 1977 - Apr. 1979.
D. Schutz, and O. Buxbaum. 1979, 166p LBF-S-142, ICAF-CONF-1979
Conf-Presented at 16TH Conf. Of Intern. Comm. Aeron. Fatigue, Brussels, 1979.

Investigations into fatigue and fatigue related disciplines, as they regard aeronautics, are reviewed. Studies treated are limited to those carried out in the Federal Republic of Germany. Subjects include measurement and analysis of operational loads, fatigue behavior of joints and notched specimens, fatigue life prediction, cyclic stress-strain behavior, and low cycle fatigue. Also considered are crack propagation, fracture mechanics, and residual static strength. Fatigue of fiber reinforced plastics and hybrid structures as well as some investiga-

tions of general interest with and without relation to aircraft are reported on. Finally, a bibliography of fatigue related documents by German authors is given.

N80-14840/6 PC **A05/MF A01**
National Aeronautics and Space Administration, Langley Station, VA. Langley Research Center.
Evaluation of Helicopter Noise Due to B Blade-Vortex Interaction for Five Tip Configurations.
D. R. Hoad. Dec 79, 80p NASA-TP-1608, AVRADCOM-TR-80-B1
Contract DA PROJ. 1L2-62209-AH-76
Subm-Prepared Jointly with Avradcom, Hampton, VA.

The effect of tip shape modification on blade vortex interaction induced helicopter blade slap noise was investigated. Simulated flight and descent velocities which have been shown to produce blade slap were tested. Aerodynamic performance parameters of the rotor system were monitored to ensure properly matched flight conditions among the tip shapes. The tunnel was operated in the open throat configuration with treatment to improve the acoustic characteristics of the test chamber. Four promising tips were used along with a standard square tip as a baseline configuration. A detailed acoustic evaluation on the same rotor system of the relative applicability of the various tip configurations for blade slap noise reduction is provided.

N80-14843/0 PC **A03/MF A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Acoustic Considerations of Flight Effects on Jet Noise Suppressor Nozzles.
U. Vonglahn. 1979, 26p NASA-TM-81377, E-282
Conf-Presented at the Aiaa 18TH Aerospace Sci. Meeting, Pasadena, Calif., 14-16 Jan. 1980.

The inflight acoustic characteristics of high velocity jet noise suppressor nozzles for supersonic cruise aircraft were reviewed. The inflight effects at the peak noise level were discussed. Both single and inverted velocity profile multistream suppressor nozzles were considered. The importance of static spectral shape on the noise reduction due to in-flight effects was stressed.

PAT-APPL-6-064 932 PC **A02/MF A01**
Department of the Air Force Washington DC
Aerial Refueling Receptacle Floodlights - Spoiler and Fuselage, Nose Mounted.
Patent Application,
Filed 8 Aug 79, 16p AD-D006 754/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention comprises a unique aerial refueling receptacle floodlight system which, in structural combination with a fuel receiving aircraft upon which the system is mounted, results in providing adequate illumination of the aircraft's refueling receptacle; and, therefore, also results in the efficient and effective refueling of the in-flight receiving aircraft during the night.

PAT-APPL-6-066 358 PC **A02/MF A01**
Department of the Air Force Washington DC
Tail Carriage of Stores.
Patent Application,
Kenneth M. Edwards. Filed 14 Aug 79, 9p AD-D006 759/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A system for carrying and rewardly launching and/or ejecting a store from an aircraft while flying at low altitudes. The store which may be in the form of a bomb, pod, missile, etc is mounted at the top of one or more vertical stabilizers at the aft end of the aircraft. Aerodynamic lift and drag generated by the store shape causes the store to separate from the aircraft and move upward and aft therefrom. The store becomes a lifting body and gains altitude before falling on target thus enabling the carrying aircraft to remove itself from the blast area preventing possible damage to the aircraft. (Author)

PAT-APPL-6-072 857 PC **A02/MF A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Multiwall Thermal Protection System.
Patent Application,
L. R. Jackson. Filed 5 Sep 79, 19p N80-12117/1, NASA-CASE-LAR-12620-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Multiwall insulating sandwich panels are provided for thermal protection of hypervelocity vehicles and other enclosures. In one version of the invention, the multiwall panels are formed of alternate layers of dimpled and flat metal (titanium alloy) foil sheets and beaded scarfed edge seals to provide enclosure thermal protection up to 1000 F. Another version employs an intermediate fibrous insulation for the sandwich panel to provide thermal protection up to 2000 F, and a third version employs a silicide coated columbium waffle as the outer panel skin and fibrous layered intermediate protection for thermal environment protection up to 2500 F. The use of multiple panels on an enclosure facilitates repair of the thermal protection system.

PAT-APPL-6-073 478 PC **A02/MF A01**
Department of the Air Force Washington DC
Towplate System.
Patent Application,
James E. Leger. Filed 7 Sep 79, 17p AD-D006 764/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

According to this invention a lightweight rugged system is provided wherein a link between the drogue parachute and the main parachute can be released either electrically from the aircraft cockpit or mechanically from a control box, located near the forward cargo compartment bulkhead. The electrical system makes use of a solenoid to release the link. The control box near the cargo compartment bulkhead includes an electrical override and a mechanical control for operating a push-pull cable which operates a release for the parachute. The pull-push cable can also be used to release only a part of the link to effect jettisoning of the drogue parachute.

PATENT-4 179 086 Not available NTIS
Department of the Air Force Washington DC
Arm Restraint System.
Patent,
Edwin Y. Yamada. Filed 20 Jul 78, patented 18 Dec 79, 5p AD-D006 794/2, PAT-APPL-926 361 Supersedes PAT-APPL-926 361-78, AD-D005 285.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent covers an arm restraint system for use with an aircraft ejection seat to prevent limb flailing on ejection. Long straps, which are normally loose to allow unimpeded arm and body movement of the seated crewman, are retained high on the side of the shoulder area by a flap with a Velcro fastener and by ring members on the seat buckle and on the seat frame. During the ejection sequence, the Velcro fasteners are pulled apart by the action of the straps which move downward and pin the crewman's arms against his side and lower abdomen thereby preventing flail upon entry of the crewman into the airstream. (Author)

1D. Aircraft Flight Control and Instrumentation

AD-A078 793/7 PC **A04/MF A01**
Air Force Avionics Lab Wright-Patterson AFB OH
Application of the RCA PRICE-S Software Cost Estimation Model to Air Force Avionics Laboratory Programs. Revision.
Final technical rept. Jan 78-Jul 79,
Thomas G. James, Jr., and Daniel V. Ferens. Oct 79, 51p Rept no. AFAL-TR-79-1164
Revision of Rept. no. AFAL-TM-78-25.

This report covers work conducted in-house by the System Evaluation Group (AAA-3), Avionic Systems Engineering Branch, Air Force Avionics Laboratory, Wright-Patterson AFB, Ohio 45433. This work was a calibration and validation of the proprietary RCA Corporation PRICE-S software development cost model to four AFAL software programs. The results of the study are that PRICE-S appears to work well for Air Force Avionics Laboratory programs and more validation/Calibration studies should be done. (Author)

N80-14138/5 PC **A03/MF A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Pilot Control Through the Tafcos Automatic Flight Control System.
W. R. Wehrend, Jr.. Dec 79, 42p NASA-TM-81152, A-7996

The set of flight control logic used in a recently completed flight test program to evaluate the total automatic flight control system (TAFCOS) with the controller operating in a fully automatic mode, was used to perform an unmanned simulation on an IBM 360 computer in which the TAFCOS concept was extended to provide a multilevel pilot interface. A pilot TAFCOS interface for direct pilot control by use of a velocity-control-wheel-steering mode was defined as well as a means for calling up conventional autopilot modes. It is concluded that the TAFCOS structure is easily adaptable to the addition of a pilot control through a stick-wheel-throttle control similar to conventional airplane controls. Conventional autopilot modes, such as airspeed-hold, altitude-hold, heading-hold, and flight path angle-hold, can also be included.

PATENT-4 177 681 Not available NTIS
Department of the Air Force Washington DC
Apparatus for Adjusting and Locking a Linear Actuator.
Patent,
Thomas B. Wess. Filed 6 Apr 78, patented 11 Dec 79, 5p AD-D006 796/7, PAT-APPL-893 868 Supersedes PAT-APPL-893 868-78, AD-D004 951.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention is concerned with a cylindrical linear actuator suitable for installation in a confined area and capable of infinite stroke adjustment over its scheduled travel and lockable at any position of its designated stroke includes overlapping and combining rod and stroke adjustments to minimize actuator legnth. Electrical feedback is precalibrated to give a known signal proportional to the actuator stroke and to the position of the load clevis thereby always giving the correct position of the load. (Author)

1E. Air Facilities

AD-A078 532/9 PC **A03/MF A01**
Defence Research Information Centre Orpington (England)
An Investigation into Measuring Runway Surface Texture by the Grease Patch and Outflow Meter Methods.
R. W. Sugg. Oct 79, 35p Rept nos. DRIC-BR-70263, S/T-MEMO-2-79

A measurement of 'surface texture' is used by some organizations as a means of specifying runway friction for stop distance calculations and certification purposes in spite of the conclusion by the American Society for Testing and Materials that it should be discontinued. This investigation confirms the ASTM conclusions by demonstrating the poor relationship between 'surface texture' and aircraft stop distance also between it and friction measured by two ground vehicles. A method of using 'surface texture' to predict friction of ground vehicles at high speed has been studied and the conclusion is reached that within the limits found on runways it has only a very small effect on the prediction. The investigation recommends that where high speed prediction is necessary a more accurate method is to use equations based on test data. The difficulty in arriving at a single figure for 'surface texture' is demonstrated by showing the variation that can occur along a runway and the large difference in readings between operators. (Author)

2. AGRICULTURE

2C. Agricultural Engineering

E80-10014 PC **A08**/MF **A01**
Lockheed Electronics Co., Inc., Houston, TX. Systems and Services Div.
Large Area Crop Inventory Experiment (LACIE). Phase III Direct Wheat Study of North Dakota.
Technical memo.,
M. C. Kinsler, J. D. Nichols, and A. L. Ona. Apr 79, 159p LEC-12980, NASA-CR-160340, JSC-14744
Contract NAS9-15800
Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, MD., and Department of Agriculture, Washington, DC.

The author has identified the following significant results. The green number and brightness scatter plots, channel plots of radiance values, and visual study of the imagery indicate separability between barley and spring wheat/oats during the wheat mid-heading to mid-ripe stages. In the LACIE Phase 3 North Dakota data set, the separation time is more specifically the wheat soft dough stage. At this time, the barley is ripening, and is therefore, less green and brighter than the wheat. Only 4 of the 18 segments studied indicate separation of barley/other spring small grain, even though 11 of the segments have acquisitions covering the wheat soft dough stage. The remaining seven segments had less than 5 percent barley based on ground truth data.

N80-14440/5 PC **A09**/MF **A01**
European Space Agency, Paris (France).
Satellite Remote Sensing: Applications in Agroclimatology and Agrometeorology.
E. C. Barrett. 1979, 177p ESA-SP-1020, ISSN-0379-6566
Conf-Proc. Of Lectures of Joint Esa/Food and Agr. Of UN/Wmo Intern. Training Course, Rome, 2-13 Oct. 1978.

No abstract available.

PAT-APPL-6-076 706 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Rope Wick Applicator.
Patent Application,
Jim Enoch Dale. Filed 18 Sep 79, 15p PB80-134174
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention describes a new apparatus and system for the systematic application of liquid chemicals to plants. A soft woven nylon rope wick is used to convey chemical solution from a reservoir by means of capillary action. The rope apparatus, which is physicaly supported, is leveled and positioned to selectively contact certain plants as the wick is moved across an agricultural field. Thus chemical solution is deposited selectively only on contact with the wick.

PB80-133622 PC **A12**/MF **A01**
Appropriate Technology Development Association, Lucknow (India).
Appropriate Technology: Directory of Tools, Equipments, Machines, Plants, Processes and Industries. Volume I.
Mar 77, 264p
Sponsored in part by Agency for International Development, Washington, DC.

This directory describes simple technologies and industrial processes for small communities and rural areas with complete illustrations, designs and drawings. It is divided into ten sections: Agro-tools, Hand Tools and Equipment for Crafts, Agro Processing, Village and Cottage Industries, Material Handling and Transport, Health and Hygiene, Education, Training and Culture, Work Power and Energy, Household and Domestics, and Housing and Construction. The introduction at the beginning of each section explains to the reader the concept and philosophy of appropriate technology in addition to providing guidance for its practice. A WHO'S WHO in appropriate technology is included which lists individuals and groups involved in India and abroad.

PB80-133648 PC **A06**/MF **A01**
Warpeha (Paul R.), Hyattsville, MD.
Perceptions of Technology: A Study of the Iluman Project.
Master's thesis,
Paul Raymond Warpeha. 22 May 79, 106p
Sponsored in part by Agency for International Development, Washington, DC.

In 1976, a integrated project of rural development was begun in highland Ecuador as a collaborative effort between Peace Corps Volunteers and indigenous villagers. Its focus was on the cooperative production and use of methane gas(biogas) within the context of the local community and culture, including the parameters surrounding the utilization of agricultural residues, traditional fuel usage patterns, and community health, nutrition, and sanitation systems. This paper documents the history of the Iluman Methane Gas/ Nutrition-Health/ Agriculture Project and specifically studies the impact of international development efforts and technological innovation upon a group of rural people. It deals with culturally defined perceptions of technology and the implications of change, taking into perspective the historical and sociocultural factors which determine the world-view of both the indigenous people and the foreign change agents.

PB80-804222 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Greenhouse Design, Construction, and Operation (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 80,
Audrey S. Hundemann. Feb 80, 203p
Supersedes NTIS/PS-79/0028 and NTIS/PS-78/0006.

Thermal environment, construction materials, and structural integrity of greenhouses are discussed in abstracts from worldwide literature. Topic areas cover the use of plastics and glass in greenhouse construction, with emphasis on the use of plastics; heating with solar energy and waste heat; methods of reducing heat loss; and wind load and wind induced heat transfer studies. Abstracts on air supported greenhouses and combination greenhouse-solar distillation units are included. (This updated bibliography contains 196 abstracts, 40 of which are new entries to the previous edition.)

2D. Agronomy and Horticulture

PAT-APPL-6-080 734 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Stickless Burley Tobacco Curing Frames.
Patent Application,
John E. Morrison, Jr. Filed 1 Oct 79, 16p PB80-134216
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention is an apparatus developed to suspend burley tobacco on a curing frame without the use of sticks. A plurality of individual retainer members are affixed to a rigid base member. Each retainer member comprises a base slab of resilient material with two perpendicular cross cuts in the center thereof. A hole is centered on the intersection of the two perpendicular cross cuts giving four lips which will bear on a tobacco stalk when the tobacco stalk is inserted through the center of each cross cut. This deforming resilient material will then assert pressure around the circumference of the stalk of sufficient force to hold the tobacco stalk in a verticle position throughout the tobacco curing process.

2E. Animal Husbandry

PAT-APPL-6-085 440 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Automatic Hatchery Tray Dumper.
Patent Application,
William F. Whitehead, Jr., James A. Dickens, and Benjamin C. Haynes, Jr. Filed 16 Oct 79, 19p PB80-134182
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to automatic handling equipment for the chicken layer industry. An apparatus for automatically dumping a hatchery tray is disclosed. The apparatus consists of a lifting platform suitably fitted with a tray sensing limit switch to control a double acting air cylinder which lifts the hatchery tray on the platform up and through a 100 degrees arc past vertical onto the open top of a hopper which receives the waste from the tray. Initial spring loaded starting and stopping devices are included as well as kick-off-arms to remove the hatchery tray from the hopper after dumping.

PB80-127822 PC **A14**/MF **A01**
Department of Agriculture, Washington, DC.
Proceedings of International Symposium on Animal Health and Disease Data Banks Held at Washington, DC. on December 4-6, 1978.
Nov 79, 309p MPUB-1381

The International Symposium on Animal Health and Disease Data Banks was held December 4-6, 1978, at Washington, D.C., jointly sponsored by Veterinary Services, Animal and Plant Health Inspection Service, United States Department of Agriculture, and Technical Information Systems, Science and Education Administration, United States Department of Agriculture, under the auspices of the Associates of the National Agricultural Library, Inc. The idea of a symposium to advance international utilization of animal health and disease data banks was formulated during December 1977. A group of veterinary specialists of the Animal and Plant Health Inspection Service reviewed their requirements for both bibliographic and non-bibliographic data, noted the nature of some recent symposiums, and recognized the desirability of becoming better acquainted with operational data banks worldwide in five functional areas. These areas--literature, epidemiology, clinics, diagnostic laboratories, and research in progress--were then adopted as focal points of interest for bringing together managers, operators, and users of related data banks.

2F. Forestry

PB80-125222 PC **A03**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Chaparral Conversion Potential in Arizona. Part II: An Economic Analysis.
Forest Service research paper (Final),
Thomas C. Brown, Paul F. O'Connell, and Alden R. Hibbert. Aug 74, 35p FSRP-RM-127
See also PB80-11644.

Is chaparral conversion on National Forests in the Salt-Verde Basin economical. An inventory revealed 139 chaparral areas totaling 332,796 acres meet certain crown cover, slope, and managerial criteria for conversion. The costs of converting portions of these areas to grass and maintaining the conversion over a 50-year period were compared with the benefits to society in terms of increased water yield and forage for livestock, and reduced firefighting costs. Using fire as the main conversion tool, 96 areas have a benefit-cost ratio greater than 1; using a soil-applied herbicide, 72 areas meet that economic criteria. Proper management should favorably affect soil movement, wildlife habitat, and esthetics.

PB80-131451 PC **A12**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Management of Northcentral and Northeastern Forests for Nongame Birds.
Forest Service general technical rept. (Final),
Richard M. DeGraaf, and Keith E. Evans. Jan 80, 275p FSGTR-NC-51
Proceedings of a Workshop Held at Minneapolis, MN. on January 23-25, 1979.

The report contains 26 papers that present the state-of-the-art of nongame bird research and management in northeastern United States.

3. ASTRONOMY AND ASTROPHYSICS

3B. Astrophysics

AD-A078 399/3 PC **A02**/MF **A01**
Electronics Research Lab Adelaide (Australia)
The Total Solar Eclipse of 23 October 1976 Observed at VLF.
Technical rept.,
K. J. W. Lynn. Aug 79, 22p Rept no. ERL-0093-TR

VLF transmissions at 13.6 and 22.3 kHz from Omega Reunion, Omega Japan, and NWC were monitored at Melbourne during the total solar eclipse of 23 October 1976. The solar obscuration function for each path was calculated and compared with the phase deviation observed experimentally. The phase response was found to be a non-linear function of solar obscuration with a maximum phase deviation which was less than expected when compared with the normal diurnal phase variation. A differential equation was developed to model the observations. The effective time constant of ionospheric response was found to be 4.3 + or - 1.5 min and independent of reflection height. (Author)

AD-A078 747/3 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
The Ground-Level Relativistic Solar Proton Event of May 7, 1978: A Composite Report,
M. A. Shea, D. F. Smart, M. Arens, M. Bercovitch, and T. Chiba. 1979, 8p Rept no. AFGL-TR-79-0284
Pub. in International Cosmic Ray Conference (16th) Papers, v5 p238-243 1979.

No abstract available.

AD-A078 939/6 PC **A02**/MF **A01**
Stanford Univ CA Inst for Plasma Research
Further Evidence of Solar Oscillations with a Period of 160 Minutes.
Technical rept.,
P. H. Scherrer, J. M. Wilcox, A. B. Severny, V. A. Kotov, and T. T. Tsap. Oct 79, 11p Rept no. SU-IPR-798
Contract N00014-76-C-0207

We present some new data concerning 160-minute solar oscillations. We report conclusions based on observations made at the Crimean Astrophysical Observatory and the Standard Solar Observatory during 1979. Oscillations of the sun with a period of about 160 minutes have been previously reported. The observations have been continued at other observatories with continuous agreement and improved statistical certainty. (Author)

N80-14977/6 PC **A20**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Heao Science Symposium.
C. Dailey, and W. Johnson. Nov 79, 463p NASA-CP-2113
Conf-Symp. Held at Huntsville, Ala., 8-9 May 1979.

No abstract available.

N80-15003/0 PC **A06**/MF **A01**
Planetary Science Inst., Tucson, AZ.
Planetary Astronomy.
Final Report.
C. R. Chapman. Nov 79, 122p NASA-CR-162526
Contract NASW-3134

Activities summarized relate to spectrophotometric observations and analysis of asteroids; further observations of the peculiar asteroid 624 Hektor; the search for further asteroid close encounters suitable for mass determination; the infrared search for intra-Mercurial bodies; the search for Venus ashen light; multicolor areal photometry of Uranus and Neptune; and ground-based observations of the Galilean satellites to support the Voyager mission. The following topics are examined: (1) Hektor: the largest highly elongated asteroid; (2) Uranus: disk structure within the 7300 Angstrom methane band; (3) Neptune: limb brightening within the 7300 Angstrom methane band; (4) Neptune's rotation period: a correlation and a speculation on the effect of the disk brightness distribution; (5) observing report on 1979 activities at Kitt Peak National Observatory; and (6) dynamical evolution of intra-Mercurial planetesimals.

N80-15011/3 PC **A03**/MF **A01**
Saint Marys Univ., San Antonio, TX.
X-Ray Diffraction Studies of Shocked Lunar Analogs.
Final Report.
R. E. Hanss. 26 Dec 79, 33p NASA-CR-162555
Grant NSG-9039

The X-ray diffraction experiments on shocked rock and mineral analogs of particular significance to lunar geology are described. Materials naturally shocked by meteorite impact, nuclear-shocked, or artificially shocked in a flat plate accelerator were utilized. Four areas were outlined for investigation: powder diffractometer studies of shocked single crystal silicate minerals (quartz, orthoclase, oligoclase, pyroxene), powder diffractometer studies of shocked polycrystalline monomineralic samples (dunite), Debye-Scherrer studies of single grains of shocked granodiorite, and powder diffractometer studies of shocked whole rock samples. Quantitative interpretation of peak shock pressures experienced by materials found in lunar or terrestrial impact structures is presented.

N80-15012/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Preliminary Results of Penetrator Field Test Program, Tonopah, Nevada, 16-28 April 1979.
M. B. Blanchard, U. Cianton, M. Dalbey, V. Rhoper, and J. P. Murphy. Oct 79, 36p NASA-TM-58222, JSC-16221

Subscale (0.63 scale) penetrators impacted various sizes of volcanic rocks resting on and within compacted playa sediments. All penetrators were identical in size, shape, weight, and impact velocity. Although minor variations in impact angle were documented, the final orientation of the buried penetrators was primarily a consequence of the size, shape, and depth of the rocks encountered during impact. In situ measurements of impacted penetrators revealed that surface and buried layers of rocks having diameters up to 3 times the penetrator diameter caused only small (10 deg) angles of deflection. Only large single rocks greater than 10 times the penetrator diameter caused deflections appreciably greater than 10 deg. The large deflection angles followed by the penetrator were strongly influenced by fracture planes that developed in the rock as it broke apart. No catastrophic failure of the penetrator occurred during these tests. A cross section of the path of each penetrator through the ground is shown together with details on orientation before, during, and after the tests. Comparisons are made with results of previous subscale penetrator tests, and conclusions are drawn with respect to full-scale Mars penetrator performance.

N80-15013/9 PC **A10**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Introduction to the Apollo Collections: Part 2: Lunar Breccias.
P. E. Mcgee, C. H. Simonds, J. L. Warner, and W. C. Phinney. Feb 79, 206p NASA-CR-162559

Basic petrographic, chemical and age data for a representative suite of lunar breccias are presented for students and potential lunar sample investigators. Emphasis is on sample description and data presentation. Samples are listed, together with a classification scheme based on matrix texture and mineralogy and the nature and abundance of glass present both in the matrix and as clasts. A calculus of the classification scheme, describes the characteristic features of each of the breccia groups. The cratering process which describes the sequence of events immediately following an impact event is discussed, especially the thermal and material transport processes affecting the two major components of lunar breccias (clastic debris and fused material).

N80-15023/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Possible Radio Emission Mechanism for Pulsars.
Y. A. Kovalev. Nov 79, 25p NASA-TM-75715, PR-326
Contract NASW-3199
Tran-Transl. Into English of "Vozmozhnyy Mekhanizm Radioizlucheniya Pulsarov", Rept. Pr-326 Acad. Of Sci. Ussr, Inst. Of Space Res., Moscow, 1977 p 1-25. Misc-Original Language Document Was Announced as A79-45277. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif.

A mathematical model is presented and discussed as a possible mechanism to describe radio emission from pulsars. The model determines that the magnetic field in the neutron proton electron (npe) layer of a neutron star results from a quasistationary eddy current of superconducting and normal protons relative to normal electrons, which generates radio emission by the Josephson effect. The radiation propagates in the magnetically active medium, from the optically thick npe layer to the magnetosphere through breaks in the crust. As a result, hot radio spots form on the surface of the star, and a radiation pattern forms near the magnetic poles, the cross section of which gives the observed pulse structure. Due to the specific properties of the mechanism, variations of the quasistationary current are converted to amplitude frequency variations of the radiation spectrum. Variations of the fine structure of the spectrum pulse amplitude and spectral index, as well as their correlation are discussed.

PB80-804339 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Quasars, Pulsars, and Black Holes (Citations from the NTIS Data Base).
Rept. for 1964-Jan 80,
Brian Carrigan. Feb 80, 274p
Supersedes NTIS/PS-79/0076, NTIS/PS-78/0161, and NTIS/PS-77/0168.

Astronomical surveys of quasars, pulsars, and black holes are cited. Computer simulations, mathematical models, and other methods used for the verification of hypotheses about astrophysical processes are included. (This updated bibliography contains 267 abstracts, 13 of which are new entries to the previous edition.)

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A078 394/4 PC **A07**/MF **A01**
Science Applications Inc La Jolla CA
H20-N2 Transition Rates and Line Shifts of Water Vapor.
Final rept.,
J. Nagel, and D. Rogovin. Jul 79, 131p AFWL-TR-79-3, AD-E200 395
Contract F29601-77-C-0039

The VV deactivation rate of N2 by H2O is calculated using a hard core repulsive potential. The process is found to be dominated by near resonant VR processes with large changes in rotational motion, and the rate is critically dependent on the classical path chosen. In part 2, a nonperturbative model of H2O is used to calculate the effects of centrifugal distortion on absorption line intensities. The errors are less than 10 percent for weak as well as strong lines. The effects of collision broadening by N2 and O2 are presented using Anderson theory together with dipole transitions by the multimode model.

AD-A078 462/9 PC **A06**/MF **A01**
Maryland Univ College Park Dept of Chemistry
Experimental and Theoretical Investigations of the Interactions of Alkali Metal Ions with Atmospheric Molecules.
Final rept.,
M. A. Coplan, and Millard H. Alexander. Feb 77, 115p
Contract N00014-76-C-0069

This report includes a theoretical as well as an experimental study of low energy collisions of alkali metal ions with small molecules of atmospheric importance. The initial experimental results on the

system Li(6)+ plus H2O showed how inelastic collisions can completely dominate elastic collisions for molecules with large dipole moments. This is in contrast to the small inelastic cross sections for low energy collisions between ions and homonuclear diatomic molecules. As the experimental results became available a parallel theoretical effort was begun to (1) interpret the experimental results in terms of known potential surfaces, (2) investigate thoroughly the effect of inelastic collisions on diffusion processes, (3) develop a theoretical formalism for inelastic ion-molecule collisions and (4) consider vibrational effects by studying the model system He + H2. As the theoretical work proceeded it became clear that experimental studies at as low energies as possible would be most valuable. Accordingly, experimental work on the Li(6)+ plus N2 system at an incident ion energy of 5 eV was begun. Efforts to put the measurements on an absolute scale were also initiated.

AD-A078 492/6 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Preliminary Numerical Study of the Outer Scale Size of Ionospheric Plasma Cloud Striations.
Memorandum rept.,
M. J. Keskinen, B. E. McDonald, and S. L. Ossakow. 3 Dec 79, 26p Rept no. NRL-MR-4124

The one level, two-dimensional fluid equations modelling striation development in large F region ionospheric plasma clouds have been numerically solved, using an initial one-dimensional cloud geometry, for three different initial Pedersen conductivity gradient scale lengths L = 3, 6, 10 km. In the nonlinear regime evidence is presented for an outer scale size of well developed striations in a direction (y) perpendicular to the ExB drift (x) of the plasma cloud whose initial Pedersen conductivity varies only along the drift direction.

AD-A078 599/8 PC **A04**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
ALTAIR Observations of Ionospheric Irregularities and Background Densities.
Technical note,
David M. Towle. 19 Sep 79, 66p TN-1979-41, ESD-TR-79-223
Contract F19628-78-C-0002

A series of measurements of the properties of equatorial ionospheric irregularities were made at Kwajalein, M.I. in August 1977 and July-August 1978. These measurements, involved coordinated ground based and in-situ sensors. The ARPA Long-range Tracking and Instrumentation Radar (ALTAIR), obtained backscatter and transmission data during five nights in August 1977 and eight nights in July-August 1978. This report describes the ALTAIR data from the night of 11 August 1978 which yield direct quantitative measurements of 1 m and 3/8 m irregularities and of plasma depleted regions. These plasma depleted regions, previously predicted on the basis of theoretical speculation and in-situ data, appear to be associated with the decay phase and not the generative phase of the field aligned irregularities.

AD-A078 628/5 PC **A03**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Satellite Atmospheric Radiance Measurements in the Vacuum Ultraviolet.
Environmental research papers,
R. E. Huffman, F. J. LeBlanc, J. C. Larrabee, and D. E. Paulsen. 5 Jul 79, 44p Rept nos. AFGL-TR-79-0151, AFGL-ERP-665

A satellite experiment has obtained nadir-viewing atmospheric radiance measurements in the 1100 to 2900 angstrom wavelength region from the polar orbiting satellite S3-4. This report describes the instrumentation, measurement techniques, and initial results. The observed emission is from airglow, solar scatter, and auroral regions. Spectral and spatial measurements previously unavailable have been made for the nitrogen Lyman-Birge-Hopfield emission, vacuum ultraviolet aurora, hydrogen geocorona, tropical ultraviolet airglow, twilight fluorescence nitric oxide spectrum, and night oxygen Herzberg band emission. Low values of the day and night background radiance values have been found; these values can be applied to improved missile detection techniques. Spatial resolution down to about one kilometer will enable possible variability to be sought. Observations were made in the period March to September 1978. Correlations with other geophysical factors such as solar flux, magnetic index, and seasonal variations will be made after the data base from the experiment is completed. (Author)

AD-A078 663/2 PC **A03**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Absorption Data Analysis for EUVS Experiment of the Satellites AE-C, D, and E.
Environmental research papers.
Les M. Chaikin, and Katsura Fukui. 8 Aug 79, 49p Rept nos. AFGL-TR-79-0191, AFGL-ERP-672

One of the two tasks that the Extreme Ultraviolet Spectrophotometers (EUVS) onboard the Atmosphere Explorer Satellites perform is absorption analysis of the thermosphere. The optical depth is derived from observations during parts of orbits including conditions of nearly negligible attenuation as reference. Details of two different approaches are described. The first one, used by the program LMC80, deals with certain standard optical depths only; the second one, used by the program LMC85, deals with time-ordered records of optical depths for input-controlled fixed steps in time. (Author)

AD-A078 722/6 PC **A02**/MF **A01**
Southwest Research Inst San Antonio TX
Lightning Tracking System Evaluation.
Progress rept. 1 May-13 Jul 79,
R. L. Johnson. 22 Aug 79, 6p
Contract N00014-79-C-0223

This is a progress report summarizing technical progress on (1) verification of performance of the lightning position and tracking system (LPATS) developed by Atlantic Science Corporation, and (2) a side-by-side performance comparison of the LPATS device with the lightning location system developed by Lightning Location and Protection Incorporated (LLP). (Author)

AD-A078 796/0 PC **A03**/MF **A01**
Massachusetts Univ Amherst Astronomy Research Facility
Infrared Emission Spectroscopy of Low Pressure Gaseous Discharges. II.
Interim rept.,
Peter Hansen, and Hajime Sakai. 10 Jul 79, 50p UMASS-ARF-79-305, SCIENTIFIC-2, AFGL-TR-79-0150
Contract F19628-76-C-0067
See also report dated 1 Nov 77, AD-A051 135.

This report summarizes a survey study aimed at improving our understanding of the physical processes which control the infrared radiation in the upper atmosphere. The experiment is conducted to generate various infrared bands of the atmospheric species in our large discharge chamber. Interpretations are given for the observed data by identifying the species involved and determining their parameters in terms of the atomic or molecular transitions. (Author)

AD-A078 799/4 PC **A07**/MF **A01**
Utah State Univ Logan Space Measurements Lab
Rocketborne Ionospheric Studies: 1976-1979.
Final rept. 28 May 76-30 Sep 79,
D. A. Burt, and G. D. Allred. 6 Aug 79, 143p AFGL-TR-79-0179
Contract F19628-76-C-0261

Eight instrumented sounding rockets were flown to investigate ionospheric parameters and to further the development of new instruments and measurements techniques for investigating such parameters. Particular emphasis has been placed upon development of instrumentation for electron dosing via large electron accelerators aboard the payloads and assessment of the effects of such dosing as manifest by ultraviolet, visible, and particularly infrared emissions. Launches have been accomplished under a variety of ionospheric conditions ranging from the quiescent, undisturbed ionosphere through intense auroral conditions. This report describes the program of launches and instrumentation used to accomplish the measurements.

AD-A078 918/0 PC **A03**/MF **A01**
Naval Research Lab Washington DC
A Coherent Nonlinear Theory of Auroral Kilometric Radiation.
Memorandum rept.,
Crockett L. Grabbe, P. Palmadesso, and K. Papadopoulos. 31 Oct 79, 37p NRL-MR-4087, AD-E000 342

A theory of auroral kilometric radiation due to the nonlinear interaction between negative energy electromagnetic waves and coherent EIC waves is developed. The theory predicts that such radiation produced must have X-mode polarization and must have a frequency just slightly below the Doppler-shifted beam cyclotron frequencies. The basic requirement for free space accessibility is the presence of high-energy beams and a density cavity of the type observed by Isis I measurements. It is predicted that a harmonic band structure in the kilometric radiation may be observable.

AD-A078 923/0 PC **A03**/MF **A01**
Stanford Univ CA Stanford Electronics Labs
ELF Sferic Occurrences in the Antarctic during a Solar Proton Event: Case Study of Occurrences at Byrd Station during the Event of 9 June 1968.
Final rept. 1 Dec 77-30 Nov 78,
A. C. Fraser-Smith, and R. A. Helliwell. 19 Sep 79, 45p SU-SEL-79-005, DNA-4911F, AD-E300 634
Contract DNA001-78-C-0017

Electromagnetic waves with frequencies above the extremely-low-frequency range (ELF; frequencies in the range 5 Hz-3) are susceptible to a variety of solar proton event (SPE) effects when propagating through a polar region in the earth-ionosphere waveguide. These effects appear to become less severe as the frequency of the waves becomes smaller and approaches the ELF range. Although measurements have been lacking, it would be expected that ELF wave propagation through the polar regions would be comparatively stable. To investigate polar ELF wave propagation during an SPE, we have carried out a series of measurements of the properties of ELF sferics (75 Hz) at a polar location (Byrd Station, Antarctica) during a moderately-large SPE. These measurements suggest that an SPE can significantly alter the characteristics of ELF signals propagating through the polar regions: during the first 24 hours of the SPE there was a reduction of about 50% in the median amplitudes of the sferics, compared with their amplitudes before the SPE, and there were substantial changes in their rates of occurrence.

AD-A078 962/8 PC **A03**/MF **A01**
Colorado Univ Boulder
Charged Atmospheric Conglomerates: Role of Negative Ions in Heteromolecular Nucleation; The Properties of Small Clusters and Atmospheric Ions.
Final rept. 10 Jun 76-1 Jul 79,
A. W. Castleman, Jr. 1 Jul 79, 34p ARO-14191.8-CX
Grant DAAG29-76-G-0276

There has been an enormous growth of interest in the properties of small particles and in the mechanisms by which they are formed. The research program undertaken in our laboratory was directed to a study of the fundamentals of nucleation about negative ions, with particular attention to an elucidation of the structure of small clusters, and the role of chemical bonding in establishing their stability. Using a new high pressure mass spectrometric technique, a systematic investigation of the bond energies and entropies of numerous ligand-negative ion complexes were determined. Concurrent theoretical work on the bonding of small complexes and ion-induced nucleation was also undertaken. The results have led to a more complete understanding of nucleation phenomena, and especially of the importance of cluster structure in the development of surfaces and in effecting phase transformations. In addition, the work has led to a clarification of some recent atmospheric observations reported in the literature.

N80-14608/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Rocket Ozone Sounding Network Data.
Quarterly Report, Mar. 1977 - May 1977.

D. U. Wright, A. J. Krueger, and G. M. Foster.
Nov 79, 34p NASA-TM-73283

During the period March 1977 through May 1977, three regular monthly ozone profiles were measured at Wallops Flight Center and three regular monthly ozone profiles were measured at the Churchill Research Range. One additional flight was conducted at Wallops Flight Center in support of Nimbus 4 SBUV. Data results and flight profiles for the period covered are presented.

N80-14609/5 PC **A06**/MF **A01**
Max-Planck-Inst. fuer Aeronomie, Lindau Uber Northeim (Germany, F.R.).
Speeches and Lectures Delivered on the Occasion of Professor Doctor Walter Dieminger's Retirement as Director of the Max-Planck Institute for Aeronomy Ansprachen und Vortraege Anlaesslich Seiner Feierlichen Verabschiedung Aus Sein Em Amt als Direktor des Max-Planck-Instituts fuer Aeronomie AM 9 und 10 1975.
G. Pfotzer. 1977, 121p REPT-55/1977, ISBN-3-540-08327
Conf-Lectures Presented at Landau, West Germany, 9-10 Jul. 1975. Partly in German and English.

No abstract available.

N80-14815/8 PC **A08**/MF **A01**
Institute for Atmosphere Optics and Remote Sensing, Hampton, VA.
Analytic Modeling of Aerosol Size Distributions.
A. Deepack, and G. P. Box. Nov 79, 165p NASA-CR-159170
Contract NAS1-15198

Mathematical functions commonly used for representing aerosol size distributions are studied parametrically. Methods for obtaining best fit estimates of the parameters are described. A catalog of graphical plots depicting the parametric behavior of the functions is presented along with procedures for obtaining analytical representations of size distribution data by visual matching of the data with one of the plots. Examples of fitting the same data with equal accuracy by more than one analytic model are also given.

N80-15025/3 PC **A05**/MF **A01**
Illinois Univ. at Urabana-Champaign. Aeronomy Lab.
Research in Aeronomy.
Progress Report, 1 Oct. 1978 - 31 Mar. 1979.
B. Edwards. 31 Mar 79, 76p NASA-CR-162558, PR-79-1
Subm-Sponsored by NASA and NSF.

Topics covered include planetary wave dynamics; nitric oxide and planetary waves in the lower ionosphere; ellipse launches; Nike Orion payloads, energy budget, energetic particles in the midlatitude and equatorial zones; electron density in the nighttime ionosphere; partial-reflection drift measurements in the D-region, the structure and variability of atmospheric tides; coherent scatter-radar; and a laser system for measuring the distribution of atmospheric sodium in the 80 km to 100 km altitude.

PB80-122815 PC **A08**/MF **A01**
SRI International, Menlo Park, CA.
Survey of the Role of NOx in Nonurban Ozone Formation.
Final rept.,
J. R. Martinez, and H. B. Singh. Sep 79, 156p 6780-8, EPA/450/4-79-035
Contract EPA-68-02-2835

This study surveys and summarizes current knowledge about the role of oxides of nitrogen (NOx) in the formation of ozone (O3) in nonurban areas. Project elements include a literature review, a survey of expert opinion, and analyses of field data. The results of the study show that present knowledge about NOx/O3 interactions in nonurban areas is fragmentary, and that there is no direct quantitative description of the link between urban NOx and nonurban O3. A preliminary analysis of nine rural and suburban sites indicates that transport is the principle mechanism associated with ozone levels that exceed 100 ppb. The analysis further suggests that transport times of the order of six to eight hours are most likely to be associated with the high ozone observed at these sites.

PB80-134588 PC **A19**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Space Environment Lab.
Solar-Terrestrial Predictions Proceedings. Volume 1: Prediction Group Reports.
Richard F. Donnelly. Aug 79, 445p NOAA-79112601
Proceedings of International Solar-Terrestrial Predictions and Workshop, held in Boulder, CO, on April 23-27, 1979.

Volume I of the Proceedings of the International Solar-Terrestrial Predictions contains the Prediction Group Reports which review the current practice in solar-terrestrial predictions. The goals of the program were as follows: (1) to determine and document the current state-of-the-art of solar-terrestrial predictions, the applications of these predictions, and the future needs for solar-terrestrial predictions, (2) to encourage research, development and evaluation of solar-terrestrial predictions, and (3) to provide indepth interaction of prediction users, forecasters and scientists involved in the research and development of prediction techniques.

PB80-137805 PC **A02**/MF **A01**
National Oceanic and Atmospheric Administration, Silver Spring, MD. Air Resources Labs.
A Comparative Synopsis of Model Atmospheres for 1954, 1958, 1962, and 1976 Below 47 Kilometers.
Technical memo.,
Robert H. Cordella, Jr., and Jeanne M. Clore. Aug 79, 23p NOAA-TM-ERL-ARL-79, NOAA-79121202

Research has refined atmospheric models over time. In the past current standard atmosphere was referenced for each set of measurements to compensate for the effects of pressures, density and temperature. Surviving documentation rarely specifies which year's model was used in calibration but often pressure versus altitude data are available. Also reference to a subsequent year's model is now relevant. This report provides a simple means of comparing models to each other and to data records by reducing them to one equation for each parameter versus altitude. Constants and variables are tabulated by year and a computer program for generating the dependent variables is included. This work originated as a prelude to an error analysis of a family of turbine type flow sensors from 20-40 km from 1954 to the present.

PB80-804487 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Air Pollution Tracer Studies in the Lower Atmosphere (Citations from the NTIS Data Base).
Rept. for 1964-Jan 80,
Diane M. Cavagnaro. Feb 80, 204p
Supersedes NTIS/PS-79/0099, NTIS/PS-78/0183 and NTIS/PS-77/0180.

The cited reports cover research on the use of tracers to study lower atmospheric air pollution movements. The tracer used include sulfur hexafluoride, krypton 85, carbon 14, and other radioactive isotopes. The studies cite the results and techniques used, tracer movement from nuclear power plants, industrial stacks, urban areas, and the detectors used in their measurement. (This updated bibliography contains 197 abstracts, 31 of which are new entries to the previous edition.)

PB80-804677 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
The Chemistry and Physics of Ozone in the Stratosphere and Upper Atmosphere. Volume 2. 1977-January, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-Jan 80,
Diane M. Cavagnaro. Feb 80, 215p
Supersedes NTIS/PS-79/0073, NTIS/PS-78/0063, and NTIS/PS-77/0020. See also Volume 1, 1964-1976, NTIS/PS-79/0072.

The bibliography contains selected abstracts of research reports concerning chemical reactions and kinetics, particle physics, photochemistry, transport processes, and atmospheric models of ozone in the stratosphere. Analysis and sounding procedures and data are excluded. Effects of supersonic transport aircraft exhaust on ozone concentrations are included. (This updated bibliography contains 208 abstracts, 59 of which are new entries to the previous edition.)

4B. Meteorology

AD-A078 324/1 PC **A03**/MF **A01**
Florida State Univ Tallahassee
Laboratory Modelling of Oceanic Response to Monsoonal Winds.
Technical rept.,
Ruby Krishnamurti. Dec 77, 38p Rept no. TR-15
Contract N00014-75-C-0877

In a laboratory model ocean, fluid in a rotating tank a varying depth is subjected to various stress patterns which simulate both steady and seasonally varying winds, including monsoonal winds. For a certain range of the governing parameters (Rossby number, Ekman number and Froude number), a homogeneous fluid displays steady westward intensified flow. For the same range of parameters a two-layer fluid can have baroclinic instabilities. The parameter range for these instabilities is mapped in a regime diagram. The northward transport of the western boundary current is measured as it varies with imposed wind-stress curl, and is compared with the corresponding values in a homogeneous fluid. The conditions for surfacing of the lower layer is measured as it varies with Rossby number and Froude number. Finally a movie is shown of the response of a two layer fluid to periodically varying winds corresponding to southwest and northeast monsoons. (Author)

AD-A078 332/4 PC **A03**/MF **A01**
Army Electronics Research and Development Command White Sands Missile Research NM Atmospheric Sciences Lab
The Visioceilometer: A Portable Cloud Height and Visibility Indicator.
Research and development technical rept.,
Robert S. Bonner, and William J. Lentz. Oct 79, 40p Rept no. ERADCOM/ASL-TR-0042

The first experimental prototype (model-1) visioceilometer has been developed. It measures cloud height from 50 to 3000 meters with 10-meter accuracy and calculates visibility from a sample volume up to 1 kilometer in length of the lidar return. It consists of a hand-held, battery-operated lidar which uses the AN/GVS-5 laser rangefinder optics. Measurements of visibility in fog and cloud ceiling height in clear air and rain were taken at the fog dispersion test facility at Otis Air Force Base, MA. In relatively homogeneous fogs, the visibility accuracy was comparable to standard transmissometers. The cloud ceiling accuracy was also comparable to the standard rotating beam ceilometer.

AD-A078 346/4 PC **A18**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Mildenhall RAF, Mildenhall, United Kingdom. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
22 Dec 78, 411p Rept no. USAFETAC/DS-79/095

This report is a six-part statistical summary of surface weather observations for Mildenhall RAF, Mildenhall, United Kingdom. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A078 347/2 PC **A17/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Vicenza, Italy. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A, C-F.
Final rept.
1 Feb 79, 384p Rept no. USAFETAC/DS-79/096

This report is a six-part statistical summary of surface weather observations for Vicenza, Italy. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A078 348/0 PC **A18/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Bentwaters RAF, Woodbridge, United Kingdom. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
24 Oct 78, 408p Rept no. USAFETAC/DS-79/098

This report is a six-part statistical summary of surface weather observations for Bentwaters RAF, Woodbridge, United Kingdom. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A078 349/8 PC **A18/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Fairford RAF, Swindon, United Kingdom. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
5 Mar 79, 405p Rept no. USAFETAC/DS-79/099

This report is a six-part statistical summary of surface weather observations for Fairford RAF, Swindon, United Kingdom. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A078 350/6 PC **A18/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Alconbury RAF, Huntingdon, United Kingdom. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
30 Nov 77, 410p Rept no. USAFETAC/DS- 79/100

This report is a six-part statistical summary of surface weather observations for Alconbury RAF, Huntingdon, United Kingdom. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A078 351/4 PC **A18/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Camp Humphries AAF, Pyongtaek, Korea. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
20 Oct 78, 425p Rept no. USAFETAC/DS- 79/103

This report is a six-part statistical summary of surface weather observations for Camp Humphries AAF, Pyongtaek, Korea. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A078 352/2 PC **A20/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Plattsburgh AFB, Plattsburgh, New York. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
26 Oct 78, 463p Rept no. USAFETAC/DS-79/106

This report is a six-part statistical summary of surface weather observations for Plattsburgh AFB, Plattsburgh, New York. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A078 353/0 PC **A18/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Lakenheath RAF, Brandon, United Kingdom. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
23 Jun 78, 410p Rept no. USAFETAC/DS-79/110

This report is a six-part statistical summary of surface weather observations for Lakenheath RAF, Brandon, United Kingdom. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A078 354/8 PC **A19/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Yokota AB, Fussa, Japan. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
6 Oct 78, 429p Rept no. USAFETAC/DS-79/111

This report is a six-part statistical summary of surface weather observations for Yokota AB, Fussa, Japan. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A078 355/5 PC **A20/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Volk FLD. Camp Douglas, Wisconsin. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
3 Aug 70, 466p Rept no. USAFETAC/DS-79/118

This report is a six-part statistical summary of surface weather observations for Volk FLD, Camp Douglas, Wisconsin. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A078 356/3 PC **A20/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Hancock IAP, Syracuse, New York. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
16 May 79, 467p Rept no. USAFETAC/DS-79/119

This report is a six-part statistical summary of surface weather observations for Hancock IAP, Syra-

cuse, New York. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A078 357/1 PC **A21**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Duluth IAP, Minnesota. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
21 Sep 72, 499p Rept no. USAFETAC/DS-79/120

This report is a six-part statistical summary of surface weather observations for Duluth IAP, Minnesota. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A078 358/9 PC **A21**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Niagara Falls MAP, New York. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
6 Oct 72, 482p Rept no. USAFETAC/DS-79/121

This report is a six-part statistical summary of surface weather observations for Niagara Falls MAP, New York. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A078 363/9 PC **A04**/MF **A01**
Air Force Weapons Lab Kirtland AFB NM
CLOUDS.
Final rept.,
Mark K. Seager. Aug 79, 55p AFWL-TR-79-108, AD-E200 400

This report is an in-depth Users Manual for the ANSI FORTRAN computer program CLOUDS. CLOUDS is designed in two major blocks: cloud field generation and cloud-free line-of-sight (CFLOS) calculation. The cloud field generation block models observed cloud fields using rotated truncated ellipsoids and rotated eliptical cylinders. The user can specify an overall (total) cloud cover or cloud cover by base height, dimensions of the clouds to be used, and fraction of clouds to be cylinders. When the cloud field has been completed, two types of plots (two-dimensional printer plots and three-dimensional META Plots) can be generated in order to view the modeled cloud field. The CFLOS calculation block generates trajectory data using either direct intercept or a chase model. Alternately, a trajectory with one defender and one to four aggressors generated by the Trajectory Analysis Program (TAP) can be used. Instantaneous CFLOS and CFLOS over discrete time intervals are calculated between the defender and each aggressor. The trajectories are rotated some user specified number of times within the stationary cloud field and the CFLOS data are recalculated. (Author)

AD-A078 368/8 PC **A03**/MF **A01**
University of Central Florida Orlando Dept of Mathematics and Statistics
A New Model for Sky Cover.
Scientific rept no. 5, 1 Sep 78-27 Aug 79,
Paul N. Somerville, and Steven J. Bean. 27 Aug 79, 37p AFGL-TR-79-0219
Contract F19628-77-C-0080

The S-distribution, which has a closed form cumulative distribution function is used to model sky cover. Models are developed for 23 stations distributed throughout the world, one for each month and for each three-hour period of the day. Estimates of the amounts of error in using the model to predict cloud cover less than a stated amount are given. (Author)

AD-A078 482/7 PC **A02**/MF **A01**
Sri International Menlo Park CA
Atmospheric Electricity and Military Operations.
Final rept.,
J. E. Nanevicz. Nov 79, 8p
Contract N00014-77-C-0326

Contents: An Airborne Electric Field-Meter System Used for Studying Electric Field Structure Near Thunderstorm Cells; A Triggered Lightning Strike to an Instrumented Learjet Aircraft; and Instrumented Learjet Aircraft Measurements of Static Electric Fields in an Around Florida Thunderstorm Anvils.

AD-A078 590/7 PC **A08**/MF **A01**
Wisconsin Univ-Madison Dept of Meteorology
Lidar Measurement of Boundary Layer Winds and Convective Structure.
Final rept. 1 Mar 76-30 Jun 79,
Edwin W. Eloranta. 20 Aug 79, 172p ARO-13535.2-GS
Grant DAAG29-76-G-0156

The following report is a summary of studies on planetary boundary layer visualization and remote determination of wind profiles and turbulence quantities by means of a lidar. These investigations rely on inhomogeneities in the natural aerosol distribution to delineate eddies in the boundary layer. Measurement of the rate of displacement of these eddies yield horizontal wind components. Observations of the daytime growth of the convective boundary layer are compared to a theoretical model. (Author)

AD-A078 624/4 PC **A07**/MF **A01**
Colorado State Univ Fort Collins
Tropical Cyclone Origin, Movement, and Intensity Characteristics Based on Data Compositing Techniques.
Final rept.,
William M. Gray. Aug 79, 128p NEPRF-CR-79-06
Contract N00228-76-C-2129

Up-to-date results of recent tropical cyclone research at Colorado State University are presented. Particular attention is paid to new findings which impact on tropical cyclone analysis and forecasting efforts. Observational studies using large amounts of composited rawinsonde, satellite, and aircraft flight data have been performed to analyze global aspects of tropical cyclone occurrences, physical processes of tropical cyclone genesis, tropical cyclone intensity change, environmental factors influencing tropical cyclone turning motion 24-36 hours before the turn takes place, tropical cyclone intensity determination from upper tropospheric reconnaissance, and the diurnal variations of vertical motion in tropical weather systems. (Author)

AD-A078 659/0 PC **A05**/MF **A01**
Lowell Univ MA
Theoretical Study of Three Dimensional Slope and Valley Wind Systems.
Final rept. 16 Dec 77-30 Jul 79,
Wen Tang, Louis N. Howard, and Lev N. Gutman. Nov 79, 83p ARO-12641.3-GS
Grant DAAG29-78-G-0012

The meso-scale flow over and around a finite length of mountain ridge and typical mountain valley terrain is studied. The present study is different from earlier analytical lee wave studies in that the solution is truly three-dimensional for more realistic topography. A simple model is developed and is attacked by multiple-scaling approach. The solutions are not only valid for large distances in the downwind direction, but are also good for the near regions. The phase lines of the vertical velocity on a horizontal plane at a given height have shape of hyperbolas and are concave toward downwind slide in accord with observations. The wind component parallel to the mountain ridge is found to be diffluent on the windward slope side, continuing to be so after crossing over the ridge in the lowest layer, and to become confluent at some distance downwind from the ridge. The intensity of the lee wave over a valley relates to the separation between the two ridges and the stability. Just above the valley floor, wind parallel to valley axis is in the down valley direction and thus raises the height of the maximum down-valley wind much higher than that of maximum 'slope wind' above the valley sides during the night. The computation also shows the increase of its intensity and height of occurrence with down-valley distance. In the farther downwind direction of the lee, the maximum confluent flow along the ridge is found at a much lower level and is stronger. The intensity and the position of the maximum wind parallel to the valley or the mountain ridges is closely related to the downslope motion of the lee wave. (Author)

AD-A078 660/8 PC **A10**/MF **A01**
Naval Air Systems Command Washington DC
Guide to Standard Weather Summaries and Climatic Services.
Reference rept.,
J. W. Ownbey. Jan 80, 209p Rept no. NAVAIR-50-1C-534
Supersedes report dated Jan 78, AD-A047 482.

This report provides a description of published and unpublished climatological summaries available from the climatic complex in Asheville, NC. It also includes a catalogue of the available summaries on a world-wide basis in continent-country-station order. (Author)

AD-A078 783/8 PC **A03**/MF **A01**
Pacific Missile Test Center Point Mugu CA
Marine/Continental History of Aerosols at San Nicolas Island During CEWCOM-78 and OSP III. Summary.
Technical publication,
J. Rosenthal, T. E. Battalino, H. Hendon, and V. R. Noonkester. Apr 79, 35p Rept no. PMTC-TP-79-32

Meteorological and optical transmission data being collected at San Nicolas Island must be categorized according to time periods representing marine, continental, or mixed aerosol sources. Based on a variety of data from sources such as surface and upper-air charts, high-resolution satellite imagery, climatological data, hourly surface observations, etc., the aerosol source regions for the OSP III and CEWCOM-78 data period were analyzed to perform such categorization. Techniques were developed for assimilating much of this information into summaries or indices which reveal the relative influence of maritime or continental conditions. Air trajectories from low-level winds and satellite cloud monitoring indicated complex circulation patterns making source region identification difficult. Some climatological and DMSP sea-surface temperature data were also useful in describing transition conditions in the lower atmosphere near San Nicolas Island. Based on the total integration of data, atmospheric conditions at San

Nicolas Island during the CEWCOM/OSP period were marked by great variability, with several episodes of strong maritime influence being separated by periods of continental influence. These changing conditions were created by moving weather systems, with transition periods characterized by air of mixed origins.

AD-A078 849/7 PC **A09/MF A01**
Tennessee Univ Space Inst Tullahoma
Proceedings of the Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems (3rd) Held April 3-5, 1979, University of Tennessee Space Institute.
Conference publication,
Dennis W. Camp, and Walter Frost. Apr 79, 191p NASA-CP-2104, FAA/RD-79-49
Contract NAS8-32692

This workshop was jointly sponsored by NASA, NOAA, and FAA and brought together many disciplines of the aviation communities. The major objectives are to satisfy such needs of the sponsoring agencies as the expansion of our understanding and knowledge of the interaction of the atmosphere with aviation systems, the better definition and implementation of services to operators, and the collection and interpretation of data for establishing operational criteria, relating the total meteorological inputs from the atmospheric sciences to the needs of aviation communities. Full-length papers from invited speakers addressed the topics of Training, Flight Operations, Accident Investigation, Air Traffic Control, and Airports and are contained in the proceedings. Other committees examined: Winds and Wind Shear; Icing and Frost; Atmospheric Electricity and Lightning; Fog, Visibility and ceilings; and Turbulence. Committee chairmen's reports on the results and conclusions of the committee meetings are given.

AD-A078 858/8 PC **A05/MF A01**
Air Weather Service Scott AFB IL
An Investigation of Radar Returns and Their Relationship to Severe Weather Occurrences.
Final rept.,
Werner Helmut Balsterholt. Nov 79, 99p Rept no. AWS/TR-79/004

FPS-77 5.4-cm radar information was gathered throughout the US, geographically and temporally separated to delineate severe from non-severe thunderstorms. The critical success indicator is used to determine the relative reliability of various radar signatures investigated. Thunderstorm structure is reviewed and evolution and development of severe storms is discussed. Environments of severe storms is analyzed and related to well-established severe storm criteria. Results reveal the 30 dBz heights, when correlated with tropopause height or height of the total storm, are excellent signatures which frequently define those thunderstorms likely to be associated with severe weather. (Author)

N80-14641/8 PC **A20/MF A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
The Stratosphere: Present and Future.
R. D. Hudson, and E. I. Reed. Dec 79, 445p NASA-RP-1049

No abstract available.

N80-14649/1 PC **A04/MF A01**
National Committee of Geodesy and Geophysics, Prague (Czechoslovakia).
National Report: Meteorology for 1975-1979.
1979, 53p
Conf-Presented at the 17TH Gen. Assembly of the Intern. Union of Geodesy and Geophys., Canberra, Australia, 1979.

Research activities conducted in 14 Czechoslovakian organizations concerned with weather and climate are summarized. Specific areas of interest include: weather forecasting; ozone distribution; air pollution; the atmospheric boundary layer and ground level; anthropogenic influences on weather and climate; aviation meteorology; cloud physics; atmospheric chemistry; agroclimatology; bioclimatology; the quasibiennial atmospheric cycle; and the hydrological function of forests. Participation in international symposia is also reported.

N80-14651/7 PC **A05/MF A01**
Tennessee Univ. Space Inst., Tullahoma.
Current Research on Aviation Weather (Bibliography), 1979.
B. S. Turkel, and W. Frost. Jan 80, 96p NASA-CR-3214
Contract NAS8-32692

The titles, managers, supporting organizations, performing organizations, investigators and objectives of 127 current research projects in advanced meteorological instruments, forecasting, icing, lightning, visibility, low level wind shear, storm hazards/severe storms, and turbulence are tabulated and cross-referenced. A list of pertinent reference material produced through the above tabulated research activities is given. The acquired information is assembled in bibliography form to provide a readily available source of information in the area of aviation meteorology.

N80-14652/5 PC **A02/MF A01**
Stanford Univ., CA. Div. of Applied Mechanics.
Stochastic Modeling of the Time-Averaged Equations for Climate Dynamics.
Annual Report, 15 Mar. 1978 - 14 Mar. 1979.
J. R. Spreiter. 1979, 22p NASA-CR-162527
Grant NSG-5254

Two analyses on climate dynamics are presented, both based on a simplified set of barotropic equations for representing large scale non-linear atmospheric circulation characteristics. The statistical properties of the set of equations were investigated for small values of a parameter k sub o, corresponding to the physical case of large zonal westerlies and relatively weak eddy motions. The effect of seasonal type forcing on the solution of these equations was also studied and some preliminary numerical results are presented.

PB80-125883 PC **A03/MF A01**
SRI International, Menlo Park, CA.
Lidar/Radiometric Study of Urban Atmospheric Processes Related to Climatic Modification.
Final rept.,
Edward E. Uthe, and Philip B. Russell. Mar 75, 32p NSF/RA/E-75-253
Grant NSF-GI-38363

Stanford Research Institute participated in the 1971, 1972, and 1973 METROMEX programs. The objective of the programs was to document urban effects on the concentration and behavior of particulate, cloud, and precipitation elements and to relate this information to atmospheric processes important to climatic modification. A three-to-four week field program was conducted in St. Louis, Missouri, during the summer of each year. Locations and times of data collection were coordinated with the activities of other METROMEX participants. Included in the instrumentation were the Stanford Research Institute-constructed mobile lidar and multiwavelength sun photometer systems, aerosol samplers, and direct and diffuse solar radiometers. In addition, extensive use was made of acoustic data collected by Argonne National Laboratory. A summary of METROMEX findings is given in this report, as well as data availability and proposed future METROMEX investigations.

PB80-130214 PC **A05/MF A01**
National Environmental Satellite Service, Washington, DC.
Environmental Satellite Imagery - April 1979.
Key to meteorological records domentation no. 5.4.
Oct 79, 100p NOAA-79113001
See also report dated Mar 79, PB80-106982.

The Key to Meteorological Records Documentation (KMRD) No. 5.4 series is issued monthly to describe current cloud data obtained by NOAA's operational environmental satellites. It contains daily global satellite imagery in condensed form as a guide to data stored in the NOAA archive, and is designed to assist users in selecting data for research and climatological use.

PB80-130339 PC **A03/MF A01**
Commonwealth Scientific and Industrial Research Organization, Aspendale (Australia). Div. of Atmospheric Physics.
Detection of Clear-Air Turbulence by Water Vapour Emission Variations - Transmittances and Weighting Functions.
Final rept.
C. M. R. Platt. Aug 79, 32p NOAA-79110204
Grant NOAA-04-78-1301-20

A simple model of a water vapor disturbance (assumed to be caused by clear air turbulence) in the stratosphere or upper troposphere is used to investigate the changes in emission along a slant path which an aircraft detector would view when encountering such a disturbance ahead of the aircraft. Transmittances for the 260/cm to 500/cm spectral region are calculated along slant paths assuming detector viewing angles above the horizon of from 0.5 degrees to 10 degrees. Weighting functions in terms of the transmittance rate of change with water path and the radiance rate of change with time are investigated for water vapor increases in a disturbance of 10 ppm. The predicted radiance changes are compared with known radiometer sensitivities and with actual changes observed by Kuhn et al.

PB80-131402 PC **A04/MF A01**
National Hurricane and Experimental Meteorology Lab., Boulder, CO.
Satellite-Estimated Rainfall in GATE.
Technical memo.,
William L. Woodley, Cecilia G. Griffith, Joseph S. Griffin, and Scott C. Stromatt. Sep 79, 63p NOAA-TM-ERL-NHEML-6, NOAA-79121204

Quantitative precipitation estimates have been made for the GARP (Global Atmospheric Research Program) Atlantic Tropical Experiment (GATE) from geosynchronous, infrared satellite imagery and a computer-automated technique that is described in this memorandum. The satellite-generated B-scale rainfall patterning is similar to, and the rain volumes are within 10% of, those provided by radar. The diurnal rainfall studies suggest a midday (about 1200 GMT) maximum of rainfall over the water areas and a late evening maximum (about 0000 GMT) over Africa and the north part of South America. Superposition of the satellite-generated rainfall maps and sea surface temperature maps by phase suggests a strong relationship between the two. Almost all of the rainfall occurs within the 26C sea surface temperature envelope. The mean daily coverage of rainfall and the mean rainfall in the areas with rain for the A scale for all GATE are 20% and 14.1 mm/d, respectively. These and other results are discussed.

PB80-133762 PC **A05/MF A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Data Report on Measurements of Precipitable Water Vapor and Cloud Liquid at Fort Sill, OK, SESAME 1979.
Data rept.,
F. O. Guiraud, J. Howard, and D. C. Hogg. Oct 79, 87p NOAA-DR-ERL-WPL-2, NOAA-79121207

A two channel microwave radiometer was operated from March 29, 1979 to June 8, 1979 for the measurement of precipitable water vapor as part of the 1979 Severe Environmental Storms and Mesoscale Experiment (SESAME) program. The radiometers were located on the Fort Sill military base at Lawton, OK, approximately 140 miles southwest of Norman, OK, to provide a continuous monitor of total precipitable water vapor as it flows from the Gulf of Mexico into the SESAME monitoring area. Included in this data report are the summaries of the measurements of precipitable water vapor, and condensed water (cloud liquid and rain), along with vapor measurements obtained from radiosonde measurements at Fort Sill and Oklahoma City, OK. Also included are rainfall summaries toward the end of the measurement period when a rain gauge was installed at the radiometer site.

PB80-133770 PC **A06/MF A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Measures of Inhomogeneity of Aerosols.
Technical memo.,
V. E. Derr, G. M. Lerfald, and M. J. Post. Sep 79, 101p NOAA-TM-ERL-WPL-38, NOAA-79121206

Eddy correlation is a general term applied to the technique of wind measurement which relies on

the observation of the time of passage of recognizable atmospheric features past two points with a known distance between them. The recognizable feature must be inhomogeneities of the atmosphere - temperature, density, or aerosol fluctuations. This paper is concerned with the use of laser illuminators which reflect from aerosol inhomogeneities and measure their time of passage over a known distance. This configuration is also called transit time lidar. The principal potential advantage of the eddy correlation technique is obtaining transverse wind velocity measurements, i.e., the velocity perpendicular to the beam, contrary to Doppler techniques which can measure only velocity components lying in the direction of the radiation beam.

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A078 295/3 PC **A03**/MF **A01**
Logistics Management Inst Washington DC
Competition in DoD Acquisitions.
Final rept.,
Richard P. White, and Myron G. Myers. May 79, 46p Rept no. LMI-RE907
Contract MDA903-77-C-0370

This report examines the downtrend in competitive procurements within DoD in order to identify principal causes. Results for the most current year, FY78, were compared with FY72 results and discussed with personnel representing various purchasing activities. Findings were that the downtrend in dollars obligated after competition was real and not caused by changes in the makeup of categories of supplies and services. The decline was caused by reduced competition in a few high dollar commodity and service categories which are identified and discussed. Explanations for the decline include the mechanics of the reporting system or judgmental reporting decisions; changes in the nature of items within a commodity category or in the quantities of items procured; and the cyclic nature and long life of major programs. No evidence supported the hypothesis that changes in policy or administrative practices contributed to the decline in competition. The one exception was in high technology areas where design and technical competition has been increased at the expense of price competition. The analysis was purposely limited in scope and did not address the other 60 to 70 percent of total obligations that includes programs, products or services that rarely have been competed or have not been competed or competed successfully. (Author)

AD-A078 325/8 PC **A03**/MF **A01**
Logistics Management Inst Washington DC
A Uniform Profit Policy for Government Acquisition. II.
Final rept.,
Robert K. Wood, and Myron G. Myers. Nov 79, 40p Rept nos. LMI-FP704, LMI-77-15-4-2
Contract MDA903-77-C-0370
See also report dated Dec 78, AD-A066 032.

This report is a follow-on to an earlier Logistics Management Institute (LMI) report, in which a policy was presented to enable the government to determine equitable profit objectives for use in contract negotiations. By stipulation of the study sponsor, the Office of Federal Procurement Policy (OFPP), LMI deliberately divorced itself from current and past approaches, policies and practices, assumed that anything in the acquisition process could be changed, and disregarded problems of making the transition to a new policy. OFPP called for public comment on LMI's December 1978 report, and subsequently asked LMI to continue its study effort in the light of that comment. Responding in the present report, LMI updates the data used to compute the coefficients in its formulas, revises its proposed policy in the light of current government practices and existing policies that cannot, for the present, be changed, and addresses the comment on its earlier report.

AD-A078 326/6 PC **A03**/MF **A01**
Logistics Management Inst Washington DC
Accelerating the Decision Process in Major System Acquisition,
William G. Moeller, John A. Becka, Carl M. Skinner, and Robert K. Wood. Sep 79, 32p Rept no. LMI-RE905
Contract MDA903-77-C-0370

The objective of this study was to ascertain how the management review process incident to DSARC milestone decisions affects the length of major system acquisitions and to determine what changes, if any, are needed in this process to accelerate major system acquisitions. Of the 13 programs reviewed during this study, only 2 were adversely affected by the DSARC management review process. In both cases the impact was minor and attributable to delays in issuing the actual SecDef decision or inability to schedule one of the DSARC principals. It was found that the management review process tends to parallel the technical development of the system and its length is a function of the chain of command within the reviewing organization. It was concluded that the DSARC management review process does not have a significant impact on the length of the major system acquisition cycle and hence, recommendations on specific steps or aspects of this process are not warranted. It was suggested that further examination into areas such as funding problems, testing requirements and concurrency may prove useful in shortening the acquisition cycle. (Author)

AD-A078 327/4 PC **A03**/MF **A01**
Logistics Management Inst Washington DC
Management Fees for Nonprofit DoD Contractors,
Myron G. Myers. Oct 79, 26p Rept no. LMI-RE906
Contract MDA903-77-C-0370

Establishment of the profit or management fee paid to a Department of Defense contractor is governed by the Department's weighted guidelines profit policy. The weighted guidelines are used primarily with profit-seeking firms, whose earnings are subject to tax. Consequently a downward adjustment of management fee is necessary for nonprofit organizations receiving such fees. A percentage adjustment is recommended; i.e., the weighted guidelines profit calculation would be multiplied by a percentage factor. The percentage factor should reflect the effective corporation tax rate. The report does not address the additional adjustment presently applied to fees for Federal Contract Research Centers. (Author)

AD-A078 342/3 PC **A04**/MF **A01**
Army Procurement Research Office Fort Lee VA
Forecasting Savings from Repetitive Competition with Multiple Awards.
Final rept.,
Richard C. Brannon, Richard P. Burns, and John I. Neely. Nov 79, 75p Rept no. APRO-807

Previous research has shown that competition usually results in lower unit prices. The literature, however, only addresses the case in which a single winner receives one contract for the total quantity required. The present study generalizes the above work by allowing for the possibility of multiple winners and also the case in which a sequence of competitive awards are made for the same item over a period of several years. A sample of 22 acquisitions was selected and contact cost data was collected. Data were adjusted to separate the effects of inflation, nonrecurring costs, and contractor learning. The savings attributable to competition were estimated. A sensitivity analysis was performed using learning curve slopes of 90, 95 and 100 percent. The sample showed an average competitive savings of 7.1 percent, based on a slope of 95 percent. The effect of competition varied widely, and in some situations competition may not be advisable. The advantages of competition could be lost if the production base were reduced to a single contractor. (Author)

AD-A078 508/9 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
An Analysis of the Management of Naval Air Systems Command Test and Evaluation Field Activities.
Master's thesis,
Lawrence William Emery. Sep 79, 72p

Requirements for test and evaluation in the weapons system acquisition process have become increasingly formalized and management of the test and evaluation activities has become more centralized, particularly with the formation of the Major Range and Test Facility Base and establishment of the Uniform Funding Policy. Management of the Navy portion of the Major Range and Test Facility Base has been delegated to the Naval Air Systems Command Test and Evaluation Group; however, most of the use of these facilities comes from the Systems and Engineering Group. Some of the problems resulting from this divided responsibility are discussed here and recommendations for improvements are presented. (Author)

AD-A078 656/6 PC **A05**/MF **A01**
Army Armament Materiel Readiness Command Rock Island IL Decision Models Directorate
Venture Evaluation and Review Technique (VERT). Users'/Analysts' Manual.
Final rept.,
G. L. Moeller. Nov 79, 100p Rept no. DRSAR-DM-T905

This Users'/Analysts' Manual provides information in sufficient detail to permit installation and application of the VENTURE EVALUATION AND REVIEW TECHNIQUE (VERT). VERT is a computerized, mathematical oriented simulation network technique designed to model decision environments under risk. Historically, VERT has been used principally to assess the risks involved in the undertaking of a new venture, as well as in the estimation of future capital requirements, control monitoring, and overall evaluation of on-going projects, programs, and systems. Modeling is accomplished with a small set of easily comprehended operators which readily facilitates the structuring of a symbolic pictorial network layout of the system under study. VERT is an adaptive tool, thereby allowing the scope and level of abstraction to rest almost entirely in the hands of the analyst. Thus, modeling can be accomplished on a one-for-one basis, whereby one real world event and activity is correspondingly represented symbolically as one event and activity in the VERT network; or, modeling can also be accomplished on a compressive basis whereby a multitude of real world events and activities are compressed into the symbolic representation of a few events and activities in the VERT network. (Author)

AD-A078 674/9 PC **A02**/MF **A01**
Air Force Engineering and Services Center Tyndall AFB FL Engineering and Services Lab
Engineering and Services Laboratory, Fiscal Year 1981. Technical Objectives Document.
15 Dec 79, 23p Rept no. AFESC/ESL-TR-79-44

This TOD describes the three Technical Planning Objectives developed to guide the conduct of research and development in passive defense techniques for the theater airbase, pavement studies, environmental pollution abatement and control, air mobility concepts, fire fighting equipment, and resource/energy conservation. (Author)

AD-A078 938/8 PC **A03**/MF **A01**
Naval Postgraduate School Monterey CA
A Decision Support System Model for Technology Transfer,
Ronald J. Roland. Nov 79, 33p Rept no. NPS52-79-002

Technology transfer is the process by which technology originating at one institutional setting is adapted for use in another. A major impediment to the implementation of new technologies to assist with managerial decision making problems is a lack of communication between the technology and mangement communities. Development of a tool designed to bridge the technology transfer gap is the goal of this research. The result will be a prototype software package which may be used on an interactive computer terminal by a manager for assistance in designing a decision support system (DSS).

N80-14829/9 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Optimal Selection from a Random Sequence with Observation Errors.
T. J. Stewart. Mar 79, 26p CSIR-TWISK-69

A form of sequential decision problem is introduced in which options are presented in sequence,

with no recall of rejected options (as in the secretary problem), but in which the value of each option may only be inferred from experiments. Decisions have thus to be made concerning both the acceptance and rejection of each option and the degree of experimentation. General properties of the optimal policy are derived, and an algorithm is obtained for the solution in a special case. This special case suggests a heuristic rule for more general situations, the performance of which rule has been investigated by a Monte Carlo study.

N80-14955/2 PC **A05/MF A01**
Information Planning Associates, Inc., Gaithersburg, MD.
Functional Design Specification: Nasa Form 1510.
Final report.
15 Nov 79, 99p NASA-CR-162513

The 1510 worksheet used to calculate approved facility project cost estimates is explained. Topics covered include data base considerations, program structure, relationship of the 1510 form to the 1509 form, and functions which the application must perform: WHATIF, TENENTER, TENTYPE, and data base utilities. A sample NASA form 1510 printout and a 1510 data dictionary are presented in the appendices along with the cost adjustment table, the floppy disk index, and methods for generating the calculated values (TENCALC) and for calculating cost adjustment (CONSTADJ). Storage requirements are given.

N80-14956/0 PC **A04/MF A01**
Jet Propulsion Lab., Pasadena, CA.
User Requirements for a Patient Scheduling System.
W. Zimmerman. 1 Dec 79, 73p NASA-CR-162539, JPL-PUB-79-119
Contract NAS7-100

A rehabilitation institute's needs and wants from a scheduling system were established by (1) studying the existing scheduling system and the variables that affect patient scheduling, (2) conducting a human-factors study to establish the human interfaces that affect patients' meeting prescribed therapy schedules, and (3) developing and administering a questionnaire to the staff which pertains to the various interface problems in order to identify staff requirements to minimize scheduling problems and other factors that may limit the effectiveness of any new scheduling system.

PB80-121213 PC **A02/MF A01**
Virginia Univ., Charlottesville. Center for the Study of Science, Technology and Public Policy.
Center for the Study of Science, Technology, and Public Policy.
Final rept.,
Mason Willrich. 30 Jun 73, 14p NSF/RA/G-73/051
Grants NSF-GI-2, NSF-GR-67

The Center served as a framework in which to develop and experiment with problem-oriented, interdisciplinary research and teaching. It was an experimental vehicle for the faculty and students of the School of Law to relate themselves and their work to other schools and departments within the University of Virginia and to various relevant governmental agencies. The Center's focus on interdisciplinary policy studies of important social problems helped to meet the need for increased concern with public policy in both the research and teaching phases of legal education. The need for more problem-oriented, interdisciplinary activity at the University of Virginia was confirmed and a number of ways to fill that need as an integral part of the University's future development were indicated.

PB80-122948 PC **A07/MF A01**
National Materials Advisory Board (NRC), Washington, DC.
Science Base for Materials Processing - Selected Topics.
Final rept.
Nov 79, 143p NMAB-355
Contract MDA903-78-C-0038
Sponsored in part by National Aeronautics and Space Administration, Washington, DC.

The report presents the highlights of a workshop on four selected topics, namely, high-speed metal removal, metal deformation processing, advanced composites, and high-modulus polymers. The objectives of the workshop were to identify areas of materials processing that could benefit from an improved science base, to define scientific information to be obtained for each process to achieve technological and economic improvements, and to explore institutional problems that must be overcome to achieve greater academic participation in processing science and more effective industry-university interaction.

PB80-124134 PC **A08/MF A01**
ARINC Research Corp., Annapolis, MD.
Development of an Electronic Data Interchange System for Port and Public Marine Terminal Management.
Final rept. 30 Sep 78-30 Sep 79,
G. Pruitt. c1979, 173p MA-PORT-970-80006
Contract DO-A01-78-00-3101

This report presents the results of the first phase of a multiphase program to develop and demonstrate a system for accomplishing electronic exchange of shipping and transportation data between public marine container terminals and shippers, forwarders, brokers, ocean carriers, land carriers, consignees, and other agencies involved in intermodal operations. The requirements for electronic data interchange for intermodal operations were defined and a set of alternative system concepts were evaluated. An electronic switching system was selected for development. A plan for a pilot demonstration system is presented.

PB80-124712 PC **A08/MF A01**
Little (Arthur D.), Inc., Cambridge, MA.
Factors Relating to the Implementation and Diffusion of New Technologies: A Pilot Study. Volume 1: Appendices Containing Case Studies.
Jul 79, 155p ADL-80978-1, NSF/PRA-7703286/2
Grant NSF-ERS77-03286
See also Volume 2, PB80-124720.

Case studies contained in the volume cover the automobile, broadcast radio, frozen foods, black and white television, and color television. These topics are considered under the following areas: scope of discussion; socio-economic, political, and technological environment; the pre-commercial period; the 'food chain'; the key actors; the commercial stage; comparative advantages; advertising, marketing and public relations; resources; manufacturers; detailed technology; government; and consumers.

PB80-124720 PC **A09/MF A01**
Little (Arthur D.), Inc., Cambridge, MA.
Factors Relating to the Implementation and Diffusion of New Technologies: A Pilot Study. Volume II: Appendices Containing Case Studies.
Jul 79, 178p ADL-80978-2, NSF/PRA-7703286/3
Grant NSF-ERS77-03286
See also Volume 1, PB80-124712.

Case studies contained in the volume include the polio vaccine, the supersonic transport, fluoridation of water supplies, computer-aided instruction, the basic oxygen process, numerical control of manufacturing, the digital computer, the laser, and the integrated circuit. These topics are considered under the following areas scope of discussion; socio-economic, political, and technological environment; the pre-commercial period; the 'food chain'; the key actors; the commercial stage; comparative advantages; advertising, marketing and public relations; resources; manufacturers; detailed technology; government; and consumers.

PB80-127830 PC **A03/MF A01**
Economic Associates, Inc., Washington, DC.
Current Problems Facing the Small R and D Firm.
Frank Piovia. Dec 79, 35p
Grant NSF-SRS79-25337

The report updates a 1977 survey (See PB80-126337) on problems faced by small companies performing research and development. Changes on the firms' perception of problems and in their business circumstances are reported. Also, details on the firms' interpretation of the causes to the problems and on dependence upon the federal goverment are presented.

PB80-130925 PC **A03/MF A01**
Institute of Public Administration, Washington, DC.
Promoting Technological Innovation in the United States: The Roles of Public and Private Sectors (Federal Incentives for Innovation NSF/DRI Task II-14).
Lyle C. Fitch. 1975, 32p NSF/RA/R-75-035
Contract NSF-C860
Prepared in cooperation with Denver Research Inst., CO.

The changing roles of public and private sectors in promoting and financing technological innovation are discussed together with some of the problems encountered by the Federal government in accelerating innovation. Principal sources of economic development in the U.S. sponsored by both public and private sectors are reviewed. Special attention focuses on those factors, such as the accumulation of scientific knowledge and resulting discoveries or new product development techniques growing out of scientific advances, heavily dependent on innovation. Emphasis then shifts to consideration of technology as a major economic development factor whose effectiveness relies almost entirely on innovative processes. The changing structure of the economy coupled with increasing governmental promotion and financing of innovation is altering the traditional role of private enterprise as the fount of innovation. Increasing governmental participation in research and development is operating through grants and contracts to both profit and non-profit private-sector research organizations. The presentation concludes with a discussion of advantages and disadvantages of contracting out to private organizations and a discussion of a case study of technology promotion in the specific area of urban mass transportation.

PB80-131444 PC **A04/MF A01**
General Accounting Office, Washington, DC. Logistics and Communications Div.
How Military Postal Service Operations Can Be Improved.
Report to the Congress.
11 Jan 80, 53p LCD-80-20

The report identifies opportunities for the Department of Defense and the U.S. Postal Service to improve the effectiveness of the Military Postal Service. A major finding involves the savings available by diverting low priority parcels bound for the United States from airlift to sealift. GAO also evaluates the actions taken in response to recommendations the Subcommittee on Postal Facilities, Mail and Labor Management, House Committee on Post Office and Civil Service, made during 1976 hearings.

PB80-133531 PC **A05/MF A01**
Kiser (John W.) III, Washington, DC.
Report on the Potential for Technology Transfer from the Soviet Union to the United States.
Final rept.,
John W. Kiser III. Jul 77, 98p NSF/PRA-7623083/1
Grant NSF-PRA76-23083
Sponsored in part by Bureau of Intelligence and Research (State), Washington, DC. Office of External Research.

The study provides information about technology, both licenses and exports, the Soviet Union has sold to the United States and other Western countries in recent years. In addition, information concerning Soviet technology of current interest to US and Western firms is included. Fields covered are chemicals, energy, electronics, food/agriculture/nutrition, scientific instruments/measuring and testing apparatus, machinery and equipment, medicine, metallurgy, mining, transportation, and environment. Related institutional aspects of Soviet technology sales are discussed, and the report concludes with a perspective on the significance of Soviet technology transfer to date and an analysis of the potential for future technology transfer from the USSR to the US. Conclusions and recommendations are also presented.

PB80-135627 PC **A02/MF A01**
Department of Housing and Urban Development, Washington, DC. Office of the Assistant Secretary for Policy Development and Research.

Guidelines for Submitting Unsolicited Proposals.
Feb 76, 17p Rept no. HUD-0000267

It is noted that under Title 5 of the Housing and Urban Development Act of 1970, HUD is authorized to undertake research, study, testing, and demonstration projects related to the mission and programs of the department. Responsibility for these functions has been delegated to the Office of the Assistant Secretary for Policy Development and Research (PD&R). National goals and the PD&R role are briefly described, and the high - priority topics on which research is presently focused are listed. The process for submitting unsolicited proposals for research and development is discussed. An unsolicited proposal is defined as a written offer to perform work which is not the result of a formal request for proposals issued by the Department. It is indicated that such proposals are a means whereby the public, the academic community, State and local governments, and industry may directly propose pertinent and creative research activities to the Department. Standards for the contents of the proposal are indicated, and the evaluation criteria applied to such proposals are listed as follows: overall technical merit of the proposed effort; potential contribution of the proposed effort to HUD program objectives; special capabilities, related experiences, facilities, or techniques offered by the proposer for achieving the objectives of the proposal; qualifications, capabilities, and experience of proposed key personnel; availability of PD&R resources in light of other research needs; and uniqueness of the proposal when compared with other current or prior research efforts in the same area, and the significance of this difference. Examples of PD&R activities are described. Means for acquiring additional information on the subject of unsolicited proposals are indicated.

PB80-135635 PC **A14**/MF **A01**
International City Management Association, Washington, DC.
Financial Management Capacity Sharing Workshops for City Managers.
Final rept.
Aug 78, 312p HUD-0000282
Grant HUD-H-2854RG

A total of 376 city or county managers, administrators, assistant managers, administrative assistants, and management specialists employed by regional planning agencies participated in an International City Management Association's workshop series designed to identify the following most critical financial management problems and need areas facing local managers and administrators: (1) fiscal policy analysis -- identifying and analyzing both the long - term and short - term costs / benefits of public policy options and decisions; (2) risk management -- identifying insurance needs and developing the most efficient mix of self - insurance and private insurance programs to meet these needs; (3) capital improvement programming -- developing, funding and updating capital improvement programs, and including elected officials in the development process; (4) developing reliable long - term estimates of local government revenue and expenditure levels; (5) predicting and coping with both direct and indirect costs of required Federal and State programs; (6) reviewing existing revenue sources to ensure that revenues are being collected as efficiently as possible; (7) identifying the impact that local government has on the local economy; (8) developing easy - to - use methods to identify how successful a public service program has been in meeting preestablished goals and objectives; (9) changing from one budget format or process to another; and (10) using data processing in day - to - day financial operations. Managers identified 17 additional finance - related needs or problem areas that are less critical, but still important. Attachments list local governments represented at the workshops, a summary statement and ten problem specification statements, additional problem and need areas identified by managers, regional workshop invitation packets and agendas, New England regional workshop information packet, a Texas regional workshop information packet, workshop summaries, the needs assessment questionnaire, and a HUD financial management capacity sharing program description.

PB80-135734 PC **A07**/MF **A01**
National Association of Counties, Washington, DC.
National Association of Counties Financial Management Capacity Sharing Local Government Needs Summary.
Final rept.
1978, 133p HUD-0000487
Contract HUD-H-2860G

This report represents the National Association of Counties' (NACo) involvement in the needs assessment process of the Financial Management Capacity Sharing Program, sponsored by HUD's Office of Policy Development and Research. It relates the process and results of the initial program phase. NACo used the nominal group technique to determine financial priority problems at a 1 - day workshop. Elected and appointed officials (county commissioners, managers, treasurers, budget directors) were divided into five discussion groups led by facilitators from the Academy for Contemporary Problems. These sessions provided participants with the opportunity to discuss and establish a list of financial problems. From approximately 180 problems identified, the following were included as most significant: (1) limited capacity for revenue, expenditure and service needs forecasting; (2) inadequate knowledge of good financial management practices on the part of elected officials, department heads and staffs; (3) State limits on revenue sources, tax rates and level of indebtedness; and (4) antiquated State laws on structure and finance. It was concluded that local governments lack the ability to adequately project future revenues and expenditures, and to obtain appropriate insurance coverage at a reasonable cost. It was also noted that local governments fail to analyze and consider properly the fiscal impact of their decisions, and are generally unable to establish a local fiscal policy. Exhibits and appendices are included.

PB80-135924 PC **A05**/MF **A01**
Department of Housing and Urban Development, San Francisco, CA. Office of Program Planning and Evaluation.
Establishing Management Agent Fees for HUD Multifamily Projects.
Evaluation rept.
Jan 78, 80p Rept no. HUD-0000519

The Office of Program Planning and Evaluation was asked to evaluate the management agent fee process for HUD multifamily insured projects since the fees being paid are discretionary and there is no common definition of what is 'good' or 'bad' management and no clear idea of what services are provided for the fee paid. Five specific techniques were used in the evaluation: indepth interviews with Housing Management officials in each field office in Region 9 (San Francisco, Calif.), interviews with managing agents in the San Francisco and Los Angeles (Calif.) areas, a site visit to the Seattle (Wash.) Regional Office and the Portland (Ore.) office, requests for information to the Office of Housing Management in each of the other HUD regions, and interrogation of the Ollie's Loan Management System regarding existing management fees. Basic findings were that the majority of field offices in Region 9 use some sort of fee review worksheet (or schedule) based in principle on that proposed in the 1973 draft handbook, most systems do not impose penalties for poor management quality, and the approach used varies for subsidized and unsubsidized projects only in the level of fees allowed. Fees requested by managing agents are generally very close to the maximums which could be approved by the field office, and field office loan management officials think that when rents increase, the management fee should be allowed to rise proportionately to account for the agent's own cost inflation. The estimated range of fees currently approved and in force is from 5 to 7.5 percent for subsidized and 4 to 6 percent for unsubsidized. Further findings, recommendations, and the study instruments are appended.

PB80-135932 PC **A04**/MF **A01**
Department of Housing and Urban Development, San Francisco, CA. Office of Program Planning and Evaluation.
Defaults Before Final Endorsement.
Evaluation rept.
Jun 74, 65p Rept no. HUD-0000520

This study, designed to determine the causes of multifamily defaults before final endorsement, describes the factors that contribute to defaults, and provides guidance for handling such defaults within HUD field offices. The study focused on those factors which HUD can influence or correct. Focusing on 31 projects in the San Francisco and Los Angeles, Calif., area offices that reported preendorsement defaults as of November 1, 1973, the evaluation was undertaken because of the high percentage of cases not yet finally endorsed which are going into default. Between November 1973 and April 1974, about 8 percent of the Section 236 and Section 221(d)(4) projects not finally endorsed in the San Francisco area were in default. For this same period in Los Angeles, over 20 percent of the Section 236 project were in default. These figures are the reported defaults and according to both HUD staff and mortgagees interviewed by the evaluators, they may be as much as 100 percent lower than the real figures. The major conclusions are that defaults before final endorsement are primarily caused by two factors: (1) delays at any point in project development -- processing, construction, cost certification, or occupancy -- including those caused by HUD and those brought on by outside factors; and (2) HUD's ineffective system for monitoring a project's progress after its initial endorsement. The following areas have been identified as particularly subject to neglect because of the absence of a monitoring system: (1) the construction inspection system has been inadequate as a monitoring tool of construction progress, (2) the premature commencement of amortization has meant that projects must make mortgage payments before sustaining occupancy is achieved, (3) the HUD staff has not been aggressive in pursuing possible defaults when the available information on construction progress and draws from interest accounts indicate possible or probable defaults, and (4) the approval of extensions of the mortgagee's decision to foreclose or assign defaulted cases has often been automatic by HUD staff without regard to the impact of such actions.

PB80-135940 PC **A04**/MF **A01**
Department of Housing and Urban Development, San Francisco, CA. Office of Program Planning and Evaluation.
Management Agent Fees.
Interim rept.,
Mar 77, 66p Rept no. HUD-0000522

Methodology, findings, and recommendations are reported for an analysis and evaluation of the management fee review and approval process in Region IX. The basic issue for this study was whether a management fee review system can be developed to assure a fair rate of return to managing agents for services provided, while protecting HUD's financial position. Would such a system be feasible for field offices, considering their workloads and operational constraints. This interim study analyzed the fee review systems in Region IX and other HUD Regions, proposed alternatives for the consideration of the Regional Office of Housing Management, and evaluated alternatives. The majority of field offices in Region IX used some sort of fee review worksheet based in principle on that proposed in the 1973 draft San Francisco Regional Office Handbook. Fees requested by managing agents were found to be generally close to the maximum which could be approved by the field office, suggesting that agents have access to the methodologies used by the field offices. There was no evidence that managing agents have been receiving exorbitant fees for their services, as had been intimated. The majority of the field office staff believe that a higher (or more 'realistic') management fee contributes to better management. The alternatives considered were (1) a uniform worksheet, which would require the development of a standard Regional worksheet for the calculation of maximum fees; (2) a bidding system, which would require an owner to solicit and receive a certain number of competitive bids prior to the selection of an agent to manage a HUD - insured project; and (3) a ceiling on administrative expenses. Using a uniform worksheet is recommended, and reasons for the recommendation are discussed. The appendices contain sample worksheets used by various Regional Offices. Graphic data are provided.

PB80-803901 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Federal Trade Commission Advertising Substantiation Program (Citations from the NTIS Data Base).
Rept. for 1964-Jan 80,
Edward J. Lehmann. Jan 80, 244p
Supersedes NTIS/PS-79/0058, NTIS/PS-78/0035, and NTIS/PS-77/0047.

Reports are referenced in which various claims concerning product performance are supported by the manufacturers. The products include automobiles, detergents, soaps, hearing aids, tires, cold remedies, television receivers, air conditioners, dental products, antiperspirants, and pet foods. (This updated bibliography contains 237 abstracts, none of which are new entries to the previous edition.)

5B. Documentation and Information Technology

AD-A078 334/0 PC **A02**/MF **A01**
Army Computer Systems Command Fort Belvoir VA
Management Information Systems. Integrated Facilities System (IFS). Volume I. Assets Accounting (AA) Subsystem. Facilities Engineering Management Subsystem (FEMS). Real Property Maintenance Activities (RPMA) Subsystem. Executive Summary.
17 Aug 78, 22p Rept no. USACSC-MANUAL-18-1-B-AKA-1
See also Volume 2, AD-A078 335.

IFS is a Standard Army Multicommand System. It was functionally designed by the Army Corps of Engineers and technically developed by the US Army Computer Systems Command. IFS records and reports estimated and actual costs associated with the maintenance and operation of army installation facilities. Included is an inventory of installation facilities, conditions, statistical data, and a history of maintenance and operational costs relative to these facilities. Also a data base is maintained for vertical reporting of installation level operation and maintenance requirements as well as status and performance in the planning, programming, budgeting and accounting of projected and actual expenditures for the operation and maintenance of army real property. There are three subsystem functions within IFS, Assets Accounting (AA), Facility Engineering Management Subsystem (FEMS), and Real Property Maintenance Activities (RPMA).

AD-A078 335/7 PC **A03**/MF **A01**
Army Computer Systems Command Fort Belvoir VA
Management Information Systems. Integrated Facilities System (IFS). Volume 2. Integrated Facilities Baseline Generation (IFBG) (DOS-E).
1 Feb 79, 36p Rept no. USACSC-manual-18-1-b-aka-2-dos-e
Includes Change 1 dated 15 Sep 79. See also Volume 3, AD-A078 336.

The conversion of the Integrated Facilities System from local automated or manual systems consists of a baseline generation period and an operational cutover period. During the baseline generation period, those master files necessary for cutover to live operations will be generated. To accomplish the creation of required master files, and selected portions of the IFS operational system that pertain to editing, file building, file maintenance, and file visibility will be executed. All of the cycles required for baseline generation are contained in USACSC Manual 18-1-B-AKA, Vol III (Operations and Scheduling), with the exception of two One Time cycles which are included in this document. The purpose of this document is to provide instructions on how to use the Operations and Scheduling Manual for baseline generation. Included are narrative descriptions of each cycle, instructions on how to structure each cycle, purpose, and suggested sequence of cycles.

AD-A078 336/5 PC **A99**/MF **A01**
Army Computer Systems Command Fort Belvoir VA
Management Information Systems. Integrated Facilities System. (IFS) Volume 3. Operations and Scheduling. DOS.
1 Feb 79, 882p Rept no. USACSC-manual-18-1-b-aka-3-dos
Includes Change 1 dated 1 Apr 79, Change 2 dated 1 May 79 and Change 3 dated 15 Sep 79. See also Volume 1, AD-A078 334.

Contents: Chapter 1 - STAMMIS Summary; Chapter 2 - Schduling; Chapter 3 - Data Control; Chapter 4 - Librarian; Chapter 5 - Computer Operations; and Chapter 6 - Systems Aid Information.

AD-A078 337/3 PC **A25**/MF **A01**
Army Computer Systems Command Fort Belvoir VA
Management Information Systems. Integrated Facilities System (IFS). Volume 2. Integrated Facilities Baseline Generation (IFBG). (OS).
1 Feb 79, 582p Rept no. USACSC-manual-18-1-b-aka-2-os
Includes Change 1 dated 1 May 79 and Change 2 dated 15 Sep 79. See also Volume 3, AD-A078 338.

This volume provides information to schedule the IFBG, operate the IFBG, and distribute the output thereafter; Chapter 1 - STAMMIS Summary; Chapter 2 - Schduling; Chapter 3 - Data Control; Job Control Statement Information; Chapter 4 - Librarian; Chapter 5 - Computer Operations; and Chapter 6 - Systems Aid Information.

AD-A078 338/1 PC **A99**/MF **A01**
Army Computer Systems Command Fort Belvoir VA
Management Information Systems. Integrated Facilities System. (IFS) Volume 3. Operations and Scheduling OS.
1 Feb 79, 711p Rept no. USACSC-manual-18-1-b-aka-3-os
Includes Change 1 dated 1 May 79 and Change 2 dated 15 Sep 79. See also Volume 1, AD-A078 334.

This volume provides information to schedule the IFS, operate the IFS, and distribute the output thereafter.

AD-A078 414/0 PC **A04**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science
Serializability of Concurrent Database Updates,
Christos H. Papadimitriou. Mar 79, 57p Rept no. MIT/LCS/TR-210
Contract N00014-75-C-0661, Grant NSF-MCS77-01193
Sponsored in part by Grant NSF-MCS77-05314.

A sequence of interleaved user transactions in a database system may not be serializable, i.e., equivalent to some sequential execution of the individual transactions. Using a simple transaction model we show that recognizing the transaction histories which are serializable is an NP-complete problem. We therefore introduce several efficiently recognizable subclasses of the class of serializable histories; most of these subclasses correspond to serializability principles existing in the literature and used in practice. We also propose two new principles which subsume all previously known ones. We give necessary and sufficient conditions for a class of histories to be the output of an efficient history scheduler; these conditions imply that there can be no efficient scheduler that outputs all of serializable histories, and also that all subclasses of serializable histories studied above have an efficient scheduler. Finally, we show how our results can be extended to far more general transaction models, to transactions with partly interpreted functions, and to distributed database systems. (Author)

AD-A078 470/2 PC **A04**/MF **A01**
Harvard Univ Cambridge MA Div of Applied Sciences
On Optimization of Query Processing Strategies.
Technical rept.,
D. M. Chiu, Y. C. Ho, and P. A. Bernstein. Oct 79, 59p Rept no. TR-672
Contract N00014-75-C-0648, Grant NSF-ENG78-15231

This report examines the formulation of the query processing problem as an optimization problem. The real problem, which involves database states as parameters, is an intractable one. The problem can, however, be transformed into equivalent and simplified versions by making certain assumptions. In order to state these assumptions and the problem transformation on a formal basis, the notion of characterization is introduced. A characterization is a mapping of the database state space into a simplified parameter space. Meaningful simplification of the original problem is possible only when suitable characterizations can be found. The problem formulations in several important papers are reviewed and a detailed example is represented to illustrate some ideas.

AD-A078 795/2 PC **A04**/MF **A01**
Office of Naval Research London (England)
European Scientific Notes. Volume 33, Number 10,
R. E. Machol, and Victoria S. Hewitson. 31 Oct 79, 51p Rept no. ESN-33-10

This is a monthly publication presenting brief articles concerning recent developments in European Scientific Research. It is hoped that these articles (which do not constitute part of the scientific literature) may prove of value to American scientists by disclosing interesting information well in advance of the usual scientific publications. The articles are written primarily by members of the staff of ONRL and occasionally artically are prepared by, or in cooperation with, members of the scientific staffs of the United States Air Force's European Office of Aerospace Research and Development and the United States Army Research and Standardization Group. Articles are also contributed by visiting Stateside scientists. (Author)

ANSI-Z39-1-1977
Not available NTIS
American National Standards Inst., New York.
American National Standard for Periodicals: Format and Arrangement.
c1978, 16p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard recommends the details of format and arrangement needed to provide the bibliographic information that permits identification of periodicals and their component parts. Recommendations for each issue include specifications for title, cover and spine, table of contents, masthead, pagination, page format including margin width, errata, and instructions to authors. Recommendations for each volume include specifications for title page, table of contents, index, and numbering. Recommendations pertinent to changes or irregularities in periodical titles, interruptions of publication, cover-to-cover translation, and supplements are also included. Terms used in the standard are defined. 9 references.

ANSI-Z39-10-1971-R
Not available NTIS
American National Standards Inst., New York.
American National Standard for Directories of Libraries and Information Centers.
c1977, 12p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard provides guidelines for compilation of library and information center directories. Application of the standard varies with the type of organization (e.g., public libraries, documentation centers, or cooperative systems) and with the scope of coverage. The standard defines the term 'directory' and covers contents, arrangement of entries, table of contents and indexes, format, and individual entries for the various types of organization. 2 references.

ANSI-Z39-11-1972-R
Not available NTIS
American National Standards Inst., New York.
American National Standard System for the Romanization of Japanese.
c1978, 11p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard establishes a system (i.e., 'modified Hepburn') for romanization of the Japanese written language, including writings in classical Chinese by Japanese authors and other writings in classical

Chinese if the text incorporated Japanese 'reading marks' (kunten) or is accompanied by material in Japanese integral to the bibliographical unit. Special provision is made for romanization of non-Japanese words and proper names written in katakana, where these involve special signs not provided for by the 'modified Hepburn' system. The standard covers prerequisites for application (i.e., readings and morpheme boundaries) and general rules of application (i.e., word division, syllabic-final N, doubled consonants, and long vowels). Simple signs, digraphs representing palatalized syllables, hiragana digraphs and trigraphs containing long vowels, and modified katakana used only in representing non-Japanese words are tabulated.

ANSI-Z39-12-1972-R

Not available NTIS
American National Standards Inst., New York.
American National Standard System for the Romanization of Arabic.
c1978, 8p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard is designed for the purpose of rendering Arabic names and the titles of Arabic publications, documents, etc., into the Roman alphabet in such a manner that it is possible to reconstruct the original Arabic writing, if required. The standard is useful for compilation of library catalogs, bibliographies, lists of names, and citation of Arabic publications in books, journal articles, etc. Letters of the alphabet and vowels and diphthongs, and orthographic symbols other than letters and vowel signs are tabulated.

ANSI-Z39-13-1979

Not available NTIS
American National Standards Inst., New York.
American National Standard for Describing Books in Advertisements, Catalogs, Promotional Materials, and Book Jackets.
c1979, 12p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard provides guidelines for the kind and amount of information that book and reprint publishers should provide in their promotional materials (e.g., advertisements, catalogs, and circulars) so that their customers (i.e., the book trade, schools, libraries, educators, individual readers, etc.) can make sound decisions about their purchases. Ten promotional media (e.g., annual general catalogs, subject catalogs) and consumer, educational, institutional, and trade markets are defined. The standard lists 22 items of bibliographic data from 'author' to 'level indicator'. The recommended bibliographic elements for annual general, seasonal, and subject catalogs, for checklists, display advertising, direct mail, jackets, display material, and news/publicity are listed and tabulated.

ANSI-Z39-14-1979

Not available NTIS
American National Standards Inst., New York.
American National Standard for Writing Abstracts.
c1979, 15p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Informative and indicative abstracts are defined and distinguished from other forms of abridgment such as annotations, extracts, summaries, and synopses. The purpose and use of abstracts are discussed and guidelines for inclusion of abstracts with journals, reports, theses, monographs, proceedings, and patents are given. Directions are given for treatment of primary document content, e.g., inclusion of purpose, methodology, results and conclusions, and incidental information. Presentation and style, i.e., location of the abstract, bibliographic information, completeness, accuracy, and length, grammar, terminology, and nontextual material, are discussed. The various types of abstracts are illustrated. 10 references.

ANSI-Z39-15-1971-R

Not available NTIS
American National Standards Inst., New York.
American National Standard for Title Leaves of a Book.
c1980, 8p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard specifies the information which should be shown on the title leaves of a book and the manner in which that information should be presented to facilitate its use by bibliographers, librarians, and researchers. The standard defines 14 terms from 'edition' to 'verso'. 2 references.

ANSI-Z39-16-1979

Not available NTIS
American National Standards Inst., New York.
American National Standard for the Preparation of Scientific Papers for Written or Oral Presentation.
c1979, 16p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard provides guidelines for the preparation of scientific papers for written or oral presentation. The guidelines are directed to both authors and journal editors. General recommendations cover such topics as importance of the work to be reported and selection of the appropriate kind of paper to be prepared. The kinds of papers to which the standard applies (e.g., original articles, synoptics) and the title, by-line, and abstract are discussed. The organization of the body of the paper into sections such as introduction, Methods, and Summary, and incorporation of figures such as tables and photographs are reviewed. The standard covers principles of style, terminology, abbreviations, symbols, and units, incorporation of references, acknowledgements, footnotes, and appendixes, submission of the manuscript for publication, and preparation of scientific papers for oral presentation. 30 references.

ANSI-Z39-18-1974

Not available NTIS
American National Standards Inst., New York.
American National Standard Guidelines for Format and Production of Scientific and Technical Reports.
c1974, 16p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard establishes format and production guidelines for scientific and technical reports (including letter reports, technical memoranda, and manuals) furnished as final manuscript, reproducible copy, reproduced copy, or microform. It covers report format (i.e., order of elements, front cover, front matter, body of report, reference material, illustrations, tables, and formulas and equations) and report production (i.e., composition, workmanship, cover, page, binding, and decorative features and advertising). A sample blank report documentation page and instructions for completing it are included as an appendix. 14 references.

ANSI-Z39-19-1974

Not available NTIS
American National Standards Inst., New York.
American National Standard Guidelines for Thesaurus Structure, Construction, and Use.
c1974, 20p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard presents rules and conventions for the structure, construction, and maintenance of a thesaurus of terms which provides a systematic means of controlling the indexing and searching vocabulary of an information storage and retrieval system. The standard defines 'thesaurus' and illustrates its use. Specific rules and conventions are provided for establishing term forms (e.g., nouns, singular vs. plural), term definitions (e.g., modifiers, trademarks), and cross-references. The standard covers arrangement (i.e., introduction, displays, and sequencing), construction (i.e., concept identification, term selection, and determination of term interrelationships) and maintenance of a thesaurus. It also illustrates the interdependence between the thesaurus and the microthesaurus. 11 references.

ANSI-Z39-2-1979

Not available NTIS
American National Standards Inst., New York.
American National Standard for Bibliographic Information Interchange on Magnetic Tape.
c1979, 12p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard specifies the requirements for a generalized interchange format which accommodates bibliographic and related data such as authority records. It describes a framework for exchange of data between processing systems. The standard accommodates the description of a bibliographic unit independently or in relation to other bibliographic units. It defines 43 terms from 'base address of data' to 'variable field'. The standard bibliographic information interchange format is described under the headings 'schematic representation', 'leader', 'directory', 'variable fields', and 'record terminator'. 5 references.

ANSI-Z39-20-1974

Not available NTIS
American National Standards Inst., New York.
American National Standard Criteria for Price Indexes for Library Materials.
c1974, 12p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard provides criteria for developing price indexes to measure periodic changes in the average list price of library materials published without restriction in the United States, such as hardcover trade and technical books, paperback books, periodicals, serial services, and library-produced microfilm. The standard defines 18 terms from 'average price' to 'volume' and covers methods of compilation of price indexes for the categories of library materials described above. Dewey and Universal Decimal Classification Numbers are tabulated in an appendix for 23 subject categories from agriculture to travel.

ANSI-Z39-21-1973-R

Not available NTIS
American National Standards Inst., New York.
American National Standard for Book Numbering.
c1980, 8p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard coordinates and standardizes the use of book numbers so that a standard book number identifies one title, from one specific publisher, and is unique to that title or edition. It describes the construction of an International Standard Book Number (ISBN) and specifies the location of ISBNs on books. Procedures for hyphenation of ISBNs and calculation of the check digit, and the functions of the Standard Book Numbering Agency are described in appendixes.

ANSI-Z39-22-1974

Not available NTIS
American National Standards Inst., New York.
American National Standard Proof Corrections.
c1974, 24p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard is concerned with symbols commonly employed by proofreaders in the United States for general copy. A few special symbols characteristic of disciplines such as mathematics and some common British variants are included. Proofreading is differentiated from copyreading. The standard describes the kinds of symbols used and employment of the symbols, and discusses queries and special directions. Proofreader's marks are illustrated in tabular form.

ANSI-Z39-23-1974

Not available NTIS
American National Standards Inst., New York.
American National Standard Technical Report Number (STRN).
c1974, 8p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard provides a uniform format for creation of unique but compatible technical report numbers for use on all copies of each technical

report, including those produced on nonprint media. The standard defines 7 terms from 'technical report' to 'local suffix'. The formatting, characteristics, and application of the Standard Technical Report Number are described.

ANSI-Z39-24-1976

Not available NTIS

American National Standards Inst., New York.
American National Standard System for the Romanization of Slavic Cyrillic Characters.
c1976, 10p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard provides two tabulated systems, each with a minimum number of diacritical marks, for the romanization of the slavic Cyrillic letters used in Russian, Ukrainian, Byelorussian, Serbian, Macedonian, and Bulgarian. The systems accommodate the phonetic differences among various languages.

ANSI-Z39-25-1975

Not available NTIS

American National Standards Inst., New York.
American National Standard Romanization of Hebrew.
c1975, 15p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard recognizes that no single system for romanization of Hebrew can serve all purposes. It therefore presents four systems, each with its style, explanations, and application, including suggestions and guidelines for selection of the most appropriate system. The interrelationship between romanization, transliteration, and transcription is defined. General-purpose and more exact romanization, and narrow and keypunch-compatible transliteration styles are tabulated and discussed.

ANSI-Z39-26-1975

Not available NTIS

American National Standards Inst., New York.
American National Standard for the Advertising of Micropublications.
c1975, 2p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard details for publishers the minimum information needed in their promotional materials (e.g., printed advertisements, catalogs, circulars, and brochures) to permit a critical evaluation of their micropublications by prospective purchasers. Recommended data elements for use in promotional materials are listed; some are highlighted to provide a checklist.

ANSI-Z39-27-1976

Not available NTIS

American National Standards Inst., New York.
American National Standard Structure for the Representation of Names of Countries of the World for Information Exchange.
c1976, 2p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard adopts and extends the entity names and codes prescribed by International Standard ISO 3166, Codes for Representation of Names of Countries, to include all countries, dependencies, and areas of special sovereignty, approximating to the total land surface of the earth. A two-letter alphabetic code (alpha-2 code) and a three-letter alphabetic code (alpha-3 code) serve the requirements for a minimum length code and for a code with visual and mnemonic characteristics, respectively.

ANSI-Z39-29-1977

Not available NTIS

American National Standards Inst., New York.
American National Standard for Bibliographic References.
c1977, 92p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard covers preparation of unique human-readable bibliographic references, in a specific and consistent format, to printed materials (e.g., books, journal articles, patents, newspaper articles, letters, maps, and printed music), films, sound recordings, microforms, and computer programs. The standard contains a glossary of 249 terms and bibliographic elements. Bibliographic elements are listed in alphabetical order by bibliographic group. Application of the standard to journals, monographs, patents, conference proceedings, reports, legal materials, newspaper articles, trade catalogs, unpublished works (e.g., letters, manuscripts, dissertations), maps, printed music, sound recordings, motion pictures, audiovisual materials, videorecordings, art works, computer programs, and data files are illustrated in an appendix. Whether a bibliographic element is needed for referencing a particular type of work, the sequence in which the element should appear, and how the element should be punctuated, are also covered in appendixes. 52 references.

ANSI-Z39-31-1976

Not available NTIS

American National Standards Inst., New York.
American National Standard Format for Scientific and Technical Translations.
c1976, 10p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard specifies the format for presenting written or printed scientific and technical translations. It defines original source, and target languages and describes the essential and optional elements pertaining to the translation and the essential elements pertaining to the original. Particular forms of publication (e.g., books, report literature, patents) are identified and presentation of the translation is discussed in terms of typography, breakdown, tables and formulas, and illustrations. Translator's notes and special features of the original text, such as footnotes, bibliography, new terminology, and copyright are covered. 4 references.

ANSI-Z39-33-1977

Not available NTIS

American National Standards Inst., New York.
American National Standard for the Development of Identification Codes for Use by the Bibliographic Community.
c1977, 8p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard presents guidelines for development of new identification code standards and for modification of existing standards. Nine terms (e.g., bibliographic community and check character) are defined. Essential inclusions (i.e., statements of scope and purpose, format, user guidance, and physical placement and form) are described. The standard also covers general considerations for the development of codes, composition, and characteristics of codes, and elements of administration.

ANSI-Z39-34-1977

Not available NTIS

American National Standards Inst., New York.
American National Standard for Synoptics.
c1978, 19p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard defines the synoptic and related concise forms of publication in primary journals. It specifies the parts of a synoptic (abstract, contents), its style and clarity, its length, the requirements for the simultaneously available full papers, and discusses synoptics of serially numbered papers, citation practices, and coding and interfacing with machine-readable systems. An appendix contains three examples of synoptics and information on their use. 13 references.

ANSI-Z39-35-1979

Not available NTIS

American National Standards Inst., New York.
American National Standard System for the Romanization of Lao, Khmer, and Pali.
c1979, 14p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard provides an annotated, tabulated system for romanization of Pali (i.e., Bengali, Burmese, Devanagori, Khmer, Lao, Thai, Northern Thai, Tua Tham/A, and Tua Tham/B scripts), Lao, and Khmer personal, corporate, and place names and titles of publications and documents. The system is useful for compilation of library catalogs, bibliographies, lists of names, and citation of publications.

ANSI-Z39-37-1979

Not available NTIS

American National Standards Inst., New York.
American National Standard System for the Romanization of Armenian.
c1979, 7p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard provides an annotated, tabulated system for romanization of Armenian personal, corporate, and place names and titles of publications and documents. Romanization can also be used to reconstruct the original Armenian in most cases. The system is useful for compilation of library catalogs, bibliographies, lists of names, and citations of publications.

ANSI-Z39-39-1979

Not available NTIS

American National Standards Inst., New York.
American National Standard for Compiling Newspaper and Periodical Publishing Statistics.
c1979, 8p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard provides guidelines for compilation of statistics of newspapers and periodicals available to the public on a controlled circulation basis. The categories included (e.g., business, farm, academic, religious) and excluded are listed. Newspapers, periodicals, and circulation are defined. The standard describes methods of enumeration, classification, and compiling tables. The Dewey and Universal Decimal Classification of 35 subjects from agriculture to trade are tabulated in the appendix.

ANSI-Z39-4-1968-R

Not available NTIS

American National Standards Inst., New York.
American National Standard Basic Criteria for Indexes.
c1974, 12p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard provides guidelines and a uniform vocabulary for use in the preparation and evaluation of indexes. It deals with the principles of indexing regardless of the type of material indexed or the indexing method used. The standard defines 'collection', 'entry', 'index', and 'item', then describes the functions and general nature of indexes, the scope of indexes, the content and arrangement of indexes, the variety of indexes, and their physical format, typography and style.

ANSI-Z39-40-1979

Not available NTIS

American National Standards Inst., New York.
American National Standard for Compiling U.S. Microform Publishing Statistics.
c1979, 8p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The categories of publications in microform format which are covered by (e.g., books, newspapers, reports) and excluded from the standard are listed. The standard defines 22 terms from 'book' to 'title'. Recommended report forms for reporting the number of original microform titles published and the number of microform titles republished are illustrated.

ANSI-Z39-41-1979

Not available NTIS

American National Standards Inst., New York.
American National Standard for Book Spine Formats.
c1979, 8p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard specifies the information which should be shown on the spine of a book and the manner in which that information should be displayed. It also includes rules for the use of edge-titles. The standard defines 6 terms from 'colophon' to 'transverse spine title'. Essential information, the order in which it should be given, and how it should be presented are described.

ANSI-Z39-5-1969-R
Not available NTIS
American National Standards Inst., New York.
American National Standard for the Abbreviation of Titles of Periodicals.
c1974, 11p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard provides guidelines for creating the shortest form permitted of title abbreviations for serial and nonserial publications, the latter including monographs and proceedings of meetings. It defines 13 terms from 'acronym' to 'truncation'. The standard includes rules for word abbreviations, word order, symbols, title abbreviations, and transliteration. 4 references.

ANSI-Z39-6-1965-R
Not available NTIS
American National Standards Inst., New York.
American National Standard for Trade Catalogs.
c1977, 7p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard provides guidelines for producing trade catalogs that contain the maximum amount of necessary information in an easily usable form. It permits economy in artwork, layout, and production and use of catalogs. The standard improves the value, reliability, and usefulness of trade catalogs as a reference for users. It also serves as a checklist for preventing omissions and oversights. The standard defines the trade catalog and contains guidelines for contents (e.g., title page and index) and format (e.g., page layout, printing, and binding).

ANSI-Z39-7-1968-R
Not available NTIS
American National Standards Inst., New York.
American National Standard for Library Statistics.
c1974, 31p
Available from American National Institute, 1430 Broadway, New York, NY 10018.

The standard provides guidelines for collecting library-related statistical data. It defines 345 terms from 'abstract' to 'yearbook'. Guidelines for collecting statistical data for college and university, public, state, school, and special libraries and for library education are described in turn.

ANSI-Z39-8-1977
Not available NTIS
American National Standards Inst., New York.
American National Standard for Compiling Book Publishing Statistics.
c1978, 11p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard provides guidelines for collecting statistics for nonperiodical books and pamphlets published in the United States and made available to the public. The publications covered include government publications issued by public administrations, textbooks for use by students, university theses in published form, offprints that constitute a distinct work, series of separate bibliographical units, illustrated works (e.g., collections of prints, albums, and picture books), and computer printouts that constitute a literary or scientific publishing endeavor. The standard defines 11 terms 'book' to 'translation'. Guidelines are given for methods of enumeration, classification, and tables. Application of the guidelines is illustrated in the appendix.

ANSI-Z39-9-1979
Not available NTIS
American National Standards Inst., New York.
American National Standard for International Standard Serial Numbering (ISSN).
c1979, 8p
Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

The standard defines the structure and use of a standard code (ISSN) for the unique identification of serial publications. It defines the meaning of 'serial' and describes the format and characteristics, the physical placement, and the administration of the ISSN. The procedure for calculating the check digit and the structure and function of the International Serials Data System are described in appendixes.

ED-168 585 Not available NTIS
Information Disk: Testing a Prescribed Model in the Local Environment.
Dennis W. Dickinson, and Ruta Pempe. 1978, 32p
Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This study was conducted in order to ascertain the need for an information desk in a large research library with decentralized reference service where, on the basis of a preponderance of evidence in the available literature, a considerable demand for such a service would be expected. The desk was located in the center of the library's entrance lobby, with the intent of answering directly any questions which did not require the staff to leave the desk, and referring patrons to appropriate resources or departments. Staff recorded patron inquiries on a questionnaire which provided a list of anticipated questions and space to record any that were unspecified. Classification of questions by type was determined inductively after data had been collected, and questions about the library were coded on the basis of the usual distinctions of relative complexity and need for specialized knowledge. Analysis of the data reveals that, contrary to expectations, significant demand for services usually provided by an information desk is limited to only a few weeks per year.

ED-169 883 Not available NTIS
NTS Research Corp., Durham, NC.
A Guide to the Client Assessment Package.
Dec 78, 96p
Contract NIE-400-76-0166
Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This guide provides users of the Client Assessment Package (CAP)--a system of forms for recording the process of seeking and using information and assistance for educational improvement--with definitions, operational procedures, and instructions necessary to complete the forms accurately. The purposes of CAP are threefold: to help develop an efficient system for gathering data concerning educational information services; to process client data efficiently so that programmatic changes can be based on timely client feedback; and to identify the significant interrelationships among individual, organizational, informational, and service variables in order to improve program efforts. CAP provides the basis for recording client requests for information and assistance in five machine-readable forms: (1) service form, (2) process form, (3) linker form, (4) immediate feedback form, and (5) client assessment form. Tabulations of CAP data, designed to supplement present information service assessment procedures, will include client and request descriptions, as well as the extent of satisfication with, and utilization of, services. A sample Client Assessment Package, identification numbers, glossary of terms, and an example using CAP are included.

ED-169 884 Not available NTIS
Saskatchewan Library Association, Regina.
Standards for Libraries Within Regional Library Systems in Saskatchewan.
1978, 33p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Saskatchewan Library Association, Wapiti Regional Library, 145-12 Street, East, Prince Albert, Saskatchewan S6V 1B7 ($5.00 per copy).

These quantitative standards for the delivery of library services to a dispersed population, which were developed by the Saskatchewan Library Association, are based on the decentralized delivery of library services backed up by the centralized provision of technical services, resource people, and special collections in Saskatchewan. The roles of university, college, and special, public, school, and the Provincial Library are briefly noted. Methodologies for standards development are discussed, as well as general standards for library service in sparsely populated areas and standards for organization of a province-wide library system, including funtions, branch libraries within the system, personnel, quantitative standards for book, periodical, and non-print collections, facilities, and services. Recommendations for standards for collection development, technical services and automation, buildings for small branches, staff training, and audiovisuals are also included.

ED-169 885 Not available NTIS
A Status Report on Levels of Library and Information Services of Utah Libraries.
R. Kent Wood. Apr 79, 44p
Paper prepared for the Utah Governor's Conference on Library and Information Services, Salt Lake City, UT, April 9-11, 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

While much progress has been made since the creation of the Utah State Library Commission more than two decades ago, much more remains to be done to improve library and information services in the state. There is a critical need in school media centers for professionally trained library personnel where non-professionals may now be substituting, and many school media programs are not rated high enough to receive sufficient funds for adequate programming. There is little effort to hire adequate library media supervisors at the district level. In the public libraries, there is a movement to provide services on a pay as you go basis, ignoring the right of free information access. Services are hampered by lack of county wide library systems. Public relations and awareness programs are needed, and standards for certification of public librarians are non-existent. Urban localities are receiving the best services while rural areas are lacking. Academic libraries require more funding, facility space, and professional personnel, to function as libraries and learning resource centers. Resource surveys of special libraries are needed. Improved indexing and cataloging practices are also needed to provide access and networking with other libraries, as well as improved bibliographic and information utilization instruction, and innovative practices to improve traditional and non-traditional library services.

ED-169 889 Not available NTIS
Wisconsin Univ.-Parkside, Kenosha. Univ. Libraries.
Academic Library Development Program: Report of the Self-Study.
Oct 78, 187p
Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This final report of a management self-study based on the Academic Library Development Program, which was conducted at the University of Wisconsin-Parkside Library/Learning Center, presents study team and task force reports and cites specific issues and recommendations. Data for the study were collected through interviews and questionnaires. Examination of task force reports and study team documents discern concerns of major importance for improved operation of the Library/Learning Center. Concerns regarding management issues involve communications and reevaluation of objectives in the area of planning and policy-making; staff involvement in budgeting, purchasing, and accounting issues; and improvement of formal communications. Personnel concerns involve supervision of specific staff positions, staff development, and morale. The maintenance of collection and equipment, along with collection de-

velopment procedures, are urgent concerns in the area of service. A variety of specific problems, involving both supervision and morale, were discovered in the Technical Services Division. Important issues in the Media Services Division involve the integration of the division into a larger unit, the need for a policy manual, and increased support for the division. Survey and data collection materials are included.

ED-169 891 Not available NTIS
National Library of Canada, Ottawa (Ontario).
Canadiana: Canada's National Bibliography: Description and Guide.
1978, 53p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This guide to the national bibliography of Canada includes works published in and about Canada, works by Canadian authors, and federal, provincial, and municipal government publications. 'Canadiana' became operational in 1951 when bibliographic citations to monographs and serials were listed. As resources became available, more information and more types of materials were listed. Most recently, automation has been instituted. Brief discussions are provided of the purpose of the bibliography and its content, exclusions, and arrangement, including treatment and inclusions by material type--monographs, theses in microform, serials and monographic series, pamphlets, sound recordings, films, filmstrips, and videotapes, and Canadian government publications. Classification and cataloging procedures and a discussion of future directions are included, as well as a chronology of Canadiana inclusions since its inception in 1950 through 1978. Both English and the French versions are provided.

ED-169 892 Not available NTIS
State Univ. of New York Coll. of Environmental Science and Forestry, Syracuse.
A Compilation of Master Theses and Doctoral Dissertations Specific and/or Related to, and Having as Their Main or Partial Content, the Biological, Social, Political and Economic Aspects of the Forest Preserve and Adirondack Region of New York State,
Bill Coons. 25 Jan 79, 16p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This bibliography lists theses and dissertations completed between 1917 and 1978 by graduate degree candidates at the SUNY College of Environmental Science and Forestry. The majority of these works deal with environmental sciences research in the fields of forestry, ecology, and wildlife, and include some consideration of the political, economic, and social aspects of the New York State Forest Preserve and Adirondack Region. The 146 citations are listed alphabetically by author's name within three categories: (1) those which mention a geographical area or political unit within the Adirondacks or the word Adirondack(s) in the title of the work; (2) those which do not mention a locality in the title but which indicate by their content that they are specific to the region; and (3) those which are related but not specific to the Adirondacks and the Forest Preserve. Availability information is provided.

ED-169 893 Not available NTIS
National Center for Health Statistics, Hyattsville, MD.
Data Systems of the National Center for Health Statistics.
Jan 79, 55p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This brief, semi-technical handbook describes the various data systems of the National Center for Health Statistics (NCHS) with summaries of background, purpose and scope, sample design, data collection procedures, questionnaire content, data release, and data uses for individual NCHS surveys. NCHS operates a diverse survey and inventory program that encompasses its legislative authorization to collect statistics on (1) the extent and nature of illness and disability of the population of the United States; (2) the impact of illness and disability of the population on the economy of the United States and on other aspects of the well-being of its population; (3) health resources; (4) utilization of health care; (5) health care costs and financing; and (6) family formation, growth, and dissolution. This summary is intended to serve the needs of visitors to the NCHS, as well as those of others at the federal, state, and local levels who need to understand the structure and scope of its programs.

ED-169 896 Not available NTIS
Smithsonian Science Information Exchange, Washington, DC.
Information Services on Research in Progress: A Worldwide Inventory. Final Report.
Jul 78, 444p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This international directory of existing information systems and services on ongoing research includes descriptions of planned systems and services, those under development, and those which are fully operational, as well as several institutional initiatives which represent innovative approaches to the field. Data collection for the inventory was organized through the UNISIST Programme of the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Smithsonian Science Information Exchange (SSIE). The directory is organized in three principal parts. In the first part a narrative overview combines an examination of the contents of the inventory with a selective review of the available literature on the state of the art. The second part contains profiles of the individual systems and services identified as a result of the UNISIST/SSIE data collection. The final part consists of four indexes to the system and service profiles: (1) organization and system names: (2) acronyms; (3) names of individuals responsible; and (4) subject areas covered.

ED-169 903 Not available NTIS
Office of Education, Washington, DC.
School Library Supervision in Large Cities. Circular No. 775.
Mary Helen Mahar. 1966, 87p
Proceedings of a Conference under the auspices of the U.S. Department of Health, Education and Welfare, Office of Education, Washington, DC., September 23-25, 1964. Footnotes marginally legible due to small print.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Supt. of Docs.

Papers contributed by the conferees and members of the staff of the Office of Education are organized into seven subject areas: (1) problems of urban education and school library services; (2) interrelating curriculum and school library supervision in large cities; (3) school library services for culturally deprived children and youth in large cities; (4) school library services for gifted children and youth in large cities; (5) provision of school library personnel in large cities; (6) financial support for school libraries in large cities; and (7) guidelines for action. Specific urban areas used as examples in some of the papers include New York City, Pittsburgh, Los Angeles, and Philadelphia. Participants in this conference included personnel from the boards of education of the public school systems of the 20 largest cities; school library supervisors, school administrators, and curriculum directors from 16 of these cities; six state school library supervisors; and the president and executive secretary of the American Association of School Librarians. A list of their names and addresses is included.

PB80-119811 PC **A04**/MF **A01**
Pittsburgh Univ., PA. Senate Library Committee.
The Study of Library Use at Pitt by Professor Allen Kent, et al.: A Pittsburgh Reply.
Jul 79, 53p
See also report dated 15 Apr 78, PB-282 059.

A widely publicized study of library use at the University of Pittsburgh by Professor Allen Kent et al. (Available from NTIS as PB-282 059/5) has generated considerable controversy at Pitt and nationally. The Kent Study (KS) reports that Pitt libraries in particular and research libraries in general are spending too much money on books and periodicals which are little or never used. This assertion, if correct, has important policy implications. Consequently, the Pitt faculty, administration and librarians have repeatedly urged the Senate Library Committee (SLC) to undertake an evaluation of KS. The SLC accepted this charge and is reporting here on the substance of its findings. The SLC criticizes KS on numerous matters, in particular, its structure in text and footnotes, which makes careful investigation and reporting on it a difficult matter, and its experimental design, execution, and manipulation of data, in terms of holdings, use and costs.

PB80-121114 PC **A05**/MF **A01**
National Science Foundation, Washington, DC. Engineering and Applied Science.
Recent Research Reports Entries 844-948.
Bibliographic rept.
Oct 79, 96p NSF/RA-790155
See also PB-298 887.

Abstracts of new technical reports and other documents resulting from research supported by the Directorate for Engineering and Applied Science (EAS) of the National Science Foundation are presented. These citations have been compiled to alert members of the scientific and technical community to current research results. Some of the categories under which they are organized include: public policy and regulation; public service delivery and urban problems; industrial organizations and markets; physical, mathematical, and engineering applications; biological and ecological applications; geophysical and environmental applications; earthquake hazards mitigation; chemical threats to man and the environment; alternative biological sources of materials; science and technology to aid the physically handicapped; intergovernmental programs; energy systems; non-renewable resources - fossil energy; renewable resources - crops and solar energy; and societal response to natural hazards. The Engineering and Applied Science Directorate (EAS) seeks to strengthen the U.S. engineering and applied science research base and enhance the links between research and applications in meeting selected national goals.

PB80-125750 PC **A09**/MF **A01**
Purdue Univ., Lafayette, IN. School of Industrial Engineering.
Analysis of Management Policy for Industrial Information Centers.
Final rept.,
J. Talavage, F. Leimkuhler, and M. Barash. 1978, 183p
Grant NSF-DSI75-14772

The objective of this project has been to gather data and develop methodology which would aid information center managers in the planning and operation of their centers. A manager's activities are planning, allocating, observing, and controlling. Section 2 of this report shows the development of a methodology for assisting a manager to allocate the scarce resources in an environment of multiple and possible conflicting goals. Section 3 of this report displays a simulation model for an information center which describes, and hopefully predicts, the center's operations on a day-to-day basis. Section 4 describes a tool for evaluating information services which helps the manager to consider a service's quality from a user's viewpoint, its value from an organizational standpoint, and its effectiveness from a technical performance perspective.

PB80-127434 PC **A25**/MF **A01**
Indiana Univ. at Bloomington. School of Public and Environmental Affairs.
Environmental Policy, Law, and Administration. A Guide to Advanced Study,
Lynton K. Caldwell, and Toufiq A. Siddiqi. Jun 74, 592p NSF/RA/E-74-552

The guide is intended to assist the organization of studies dealing with the behavior of human societies and their institutions in relation to their environments. Emphasis is on a contemporary industrial and postindustrial society as it expresses its environmental relationships through defined policies, laws, and administrative arrangements. The guide

is divided into five broad areas of inquiry: basic environmental concepts; environment as a policy issue; reconciling national and technical systems; and problems of policy implementations. These are subdivided into topics which are keyed to references in comprehensive bibliographies. Each topic is defined, abstracted, and provided with a set of ten questions to enable the user to estimate his comprehension of the subject. Topics focus on: systems approach to environmental policies; environmental health and human habitation; hydraulic systems and water quality; economic aspects of environmental policies; and international institutions and arrangements.

PB80-130123 PC **A15/MF A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Volume XIII. Data Management.
Annual rept.
Oct 78, 339p NOAA-79101614
Prepared in cooperation with Bureau of Land Management, Washington, DC.

As part of the Outer Continental Shelf Environmental Assessment Program this volume contains the following annual reports for the year ending March 1978: Alaskan Outer Continental Shelf program coordination; Establish and service a product marine baseline data base for the Alaska MEA program; Bibliographic support to Alaskan outer continental shelf environmental assessment program principal investigators.

PB80-928100 Standing Order
Central Intelligence Agency, Washington, DC.
Russian Reports.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order. Single copies also available.

Subscription to this standing order service automatically brings you the full texts of all 'Russian Reports' issued by the Central Intelligence Agency. The information reported is political, statistical, and economical in such areas as agriculture, metals, minerals, natural gas, oil and materials. Information on political, economic and military structures of Communist countries are given. The same reports are also available from an NTIS standing order for 'All Communist Country Reports' and for 'All Countries' reports issued by the CIA.

PB80-928400 Subscription
Central Intelligence Agency, Washington, DC.
Chiefs of State and Cabinet Members of Foreign Governments.
Monthly repts.
1980, 12 issues
Paper copy available on subscription, North American Continent price $36.00/year; all others write for quote. Also available in single copies.

The directory lists Chiefs of State and Cabinet members of foreign goverments. The directory is updated monthly.

5C. Economics

AD-A078 704/4 PC **A02/MF A01**
Alfred P Sloan School of Management Cambridge MA
Research on Mergers, Conglomerates, and Diversification.
Final rept. 1 Jul 76-31 Mar 79,
Arnoldo C. Hax, and Stewart C. Myers. Dec 79, 9p Rept no. TR-9
Contract N00014-76-C-1033

The objectives of this effort were to create a better framework for the study of mergers and diversification; to summarize relevant information; to better understand conglomerates' organization and business strategy; and to build models to predict merger activity and the types of firms most likely to merge.

DIB-80-03-500 PC**$10.00/MF A01**
Kindel (K. W.) (Germany, F.R.).
Survey of the Market in Germany for Electronic Components.
Foreign market survey rept.
Nov 79, 51p
U. S. sales only for 8 months. Available to foreign addressees in Oct 80.

The market research was undertaken to study the present and potential US share of the market in West Germany for electronic components; to examine growth trends in West German end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques were also reviewed.

DIB-80-03-501 PC**$10.00/MF A01**
Mobius, Hong Kong.
Industrial Process Controls Market Research in Hong Kong.
Foreign market survey rept.
Nov 79, 105p
U. S. sales only for 8 months. Available to foreign addressees in Oct 80.

The market research was undertaken to study the present and potential US share of the market in Hong Kong for industrial process controls; to examine growth trends in the Hong Kong end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Hong Kong were also reviewed.

DIB-80-03-502 PC**$10.00/MF A01**
American Consulate General, Bombay (India).
India Market Research Report on Shipbuilding, Shiprepair, Port, Fishing, Fishprocessing and Oceanographic Research Equipment.
Foreign market survey rept.
A. Pinto, and V. Rangaraj. Sep 79, 136p
U. S. sales only for 8 months. Available to foreign addressees in Oct 80.

The market research was undertaken to study the present and potential US share of the market in India for shipbuilding, shipping, shiprepair, fishing, fish processing and oceanographic equipment; to examine growth trends in Indian end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in India were also reviewed.

DIB-80-03-503 PC**$10.00/MF A01**
Price Waterhouse Associates Pty., Sydney (Australia).
An Updated Report on the Oil and Gas Field Equipment Market in Australia.
Foreign market survey rept.
21 Dec 79, 34p
U. S. sales only for 8 months. Available to foreign addressees in Oct 80.

The market research was undertaken to study the present and potential US share of the market in Australia for oil and gas field equipment; to examine growth trends in Australian end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Australia were also reviewed.

DIB-80-03-504 PC**$10.00/MF A01**
Peat, Marwick, Mitchell and Co., Tokyo (Japan).
The Japanese Market for Selected Consumer Products.
Foreign market survey rept.
Dec 79, 88p
U. S. sales only for 8 months. Available to foreign addressees in Oct 80.

The market research was undertaken to study the present and potential US share of the market in Japan for selected consumer products; to examine growth trends in Japanese end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Japan were also reviewed.

DIB-80-03-505 PC**$10.00/MF A01**
Batres, Valdes, Wygard y Asociados, S. C., Mexico City.
The Mexican Market for Graphic Industries Equipment.
Foreign market survey rept.
Dec 79, 156p
U. S. sales only for 8 months. Available to foreign addressees in Oct 80.

The market research was undertaken to study the present and potential US share of the market in Mexico for graphic industries equipment; to examine growth trends in Mexican end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Mexico were also reviewed.

DIB-80-03-507 PC**$10.00/MF A01**
PA International Management Consultants, Inc., New York.
The Market for Textile, Apparel and Footwear Manufacturing Equipment in Hong Kong and Macau.
Foreign market survey rept.
Jan 80, 69p
Prepared in cooperation with PA Management Consultants Ltd. (Hong Kong).
U. S. sales only for 8 months. Available to foreign addressees in Oct 80.

The market research was undertaken to study the present and potential US share of the market in Hong Kong and Macau for textile, apparel and footwear manufacturing equipment; to examine growth trends in the Hong Kong and Macau end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques were also reviewed.

DIB-80-03-508 PC**$10.00/MF A01**
China Credit Information Service Ltd., Taipei (Taiwan). Marketing Research Dept.
Market Research Study on Fluid Power Systems and Equipment in Taiwan.
Foreign market survey rept.
Nov 79, 46p
U. S. sales only for 8 months. Available to foreign addressees in Oct 80.

The market research was undertaken to study the present and potential US share of the market in Taiwan for fluid power equipment and systems; to examine growth trends in Taiwan end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Taiwan were also reviewed.

DIB-80-03-510 PC**$10.00/MF A01**
American Embassy, Bangkok (Thailand).
Brief Market Research: Sawmilling, Woodworking, Pulp and Paper Production Equipment (Thailand).
Foreign market survey rept.,

Samran Sinmoo. Dec 79, 33p
U. S. sales only for 8 months. Available to foreign addressees in Oct 80.

The market research was undertaken to study the present and potential US share of the market in Thailand for sawmilling, woodworking, pulp and paper production equipment; to examine growth trends in the Thai end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Thailand were also reviewed.

DIB-80-03-511 PC$10.00/MF **A01**
Hong Kong Productivity Centre.
Market Survey on Laboratory Instruments in Hong Kong.
Foreign market survey rept.
Dec 79, 73p
U. S. sales only for 8 months. Available to foreign addressees in Oct 80.

The market research was undertaken to study the present and potential US share of the market in Hong Kong for laboratory instruments; to examine growth trends in Hong Kong end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Hong Kong were also reviewed.

HRP-0028286/3 Not Available NTIS
Medical Economics and Morality -- The Conflict of Canons.
Edmund D. Pellegrino. 1978, 6p
Pub. in Hospital Progress v59 n8 p50-55 Aug 78.

This essay explores the canons of 'good' economics in health and the canons of 'good' medicine. It also deals with ways of equilibrating the opposing tendencies. It is argued that there is a real danger that cost containment measures, such as service rationing, reducing demand, reallocating resources, and substituting less highly paid health workers for physicians, will increasingly come into conflict with the more traditional morality of physicians and health institutions. Patients ordinarily assume that physicians will take all measures which may benefit them, regardless of the economic or political repercussions. One example of the inevitable conflict between quality and cost containment involves the computerized axial tomography (CAT) scanner. While the economic factors concerning this sophisticated diagnostic tool must be analyzed, the significant medical benefits which can result from the technology should be weighed before any blanket policy imposing centralization of the procedure is legislated. Every measure aimed at rationing scarce resources entails moral dilemmas. Physicians must define alternatives, explicate the moral dilemmas of proposed policy, and help to frame approaches that will prevent any policy from overriding human concerns.

HRP-0030074/9 Not Available NTIS
Harvard-MIT Div. of Health Sciences and Technology, Cambridge, MA.
Economic Foundations of National Health Policy.
Allan S. Detsky. 1978, 267p
Available from Ballinger Publishing Co., 17 Dunster St., Harvard Square, Cambridge, MA 02138.

This book is intended to give economists, students of economics and medicine, physicians, policymakers, and other health professionals an idea of the foundations of health policy proposals in economic analysis. The discussion opens with an introduction to medical economics which touches on the origins of the field, the basic principles of (welfare) microeconomic theory, and ways in which the theoretical exposition of standard economic behavior must be altered to analyze the resource allocation process in the health care sector. The hospital as an economic institution is then explored in terms of the way economic models in general are constructed and used, the structure of the hospital sector, and economic models of the hospital. Much of the remaining material covers health manpower policy. The conclusions focus on national health insurance, with attention given to the Canadian experience. In addition to an exposition of the theoretical framework, the book contains a critical review of the literature, analysis, and policy suggestions.

N80-14492/6 PC **A04/MF A01**
Jet Propulsion Lab., Pasadena, CA.
Silicon Materials Outlook Study for 1980-1985 Calendar Years.
E. Costogue, R. Ferber, W. Hasbach, R. Pellin, and C. Yaws. 1 Nov 79, 74p NASA-CR-162541, JPL-PUB-79-110
Contracts NAS7-100, JPL PROJ. 5230-1-REV-A
Subm-Sponsored in Part by DOE.

The polycrystalline silicon industry was studied in relation to future market needs. Analysis of the data obtained indicates that there is a high probability of polycrystalline silicon shortage by the end of 1982 and a strong seller's market after 1981 which will foster price competition for available silicon.

PB80-124308 PC **A13/MF A01**
National Center for Atmospheric Research, Boulder, CO.
Residential Electricity Demand in Colorado Municipalities: A Time-Series Cross-Section Study.
Doctoral thesis,
John Jerome Snyder. Jun 79, 279p NCAR/CT-54
Grant NSF-ATM77-23757
Prepared in cooperation with Colorado Univ., Boulder.

The study is based on fifteen years of annual data for each of thirty-six Colorado Municipalities. In addition to average electricity prices, actual residential electric rate structures used each year in each community were recorded. 'Marginal zone prices' were developed from the rare structures in order to eliminate the simultaniety bias in price elasticity estimates when average price is used. The results suggest that previous estimates of own-price elasticity, based on average price, may be overstated by as much as a factor of two. The estimates of long-run electricity price elasticity obtained here for Colorado range from -0.4 to -0.9 in contrast to previous average electricity price elasticities based on national data which range from -1.1 to -201.

PB80-126360 PC **A06/MF A01**
Massachusetts Inst. of Tech., Cambridge. Center for Transportation Studies.
An Equilibrium Analysis of Selected Intercity Freight Markets: Trucks with Double Trailers vs. TOFC (Trailer on Flatcar) Shuttle Trains as Energy Conservation Alternatives.
Final rept. Jun-Dec 77,
Paul O. Roberts, Thomas B. Brigham, and Carol A. Miller. Dec 77, 115p CTS-77-25, DOT/RSPA/DPB/20-79/2

The objective of the research is to determine the transportation market consequences in an environment in which two competitive modes, TOFC shuttle trains and double-trailer trucks, are allowed to compete freely. The analysis requires looking at both the demand and the supply side. A model of the decisions made by individual managers responsible for logistics is used on the demand side. For each firm, it is possible to hypothesize a logistics cost for maintaining an inventory of each of the inputs used in the production process. Such a logistics cost function contains elements for placing an order, transporting the goods, distributing and storing them, paying interest on the money invested, and incurring such costs as would accrue with a stockout of these goods. The logistics cost function is minimized through simulating the manipulations of the decision-maker of certain choice variables. These include the location of point of purchase or acquisition of the product, the decision on when to reorder and in what size of shipment, and finally, the mode to be used for the transport. This model of demands by individual decision-makers is used to analyze a sample of the population of shippers within three major city-pair markets for the year 1967: Philadelphia-Cleveland, San Francisco-Los Angeles, and Chicago-Houston. The decisions of the individual decision-makers are aggregated for each of the policy options under consideration, and a comparison is performed with the base case for each market. The results give an indication of the shipper response to each of the options. Fuel use implications of each of the policy options is developed.

PB80-127640 PC **A03/MF A01**
Wharton School of Finance and Commerce, Philadelphia, PA. Dept. of Economics.
A Reevaluation of the New Jobs Tax Credit.
Final rept. Dec 78-Nov 79,
Jeffrey M. Perloff, and Michael L. Wachter. Nov 79, 44p ASPER/PUR-79/2458/A

The 1977-1978 New Jobs Tax Credit (NJTC) was designed to stimulate employment and reduce cyclical unemployment. The credit changes relative factor costs to some firms thereby causing a shift in factor proportions. In the first section, the NJTC program is described. In the second section, the basic descriptive statistics of the program are presented. It is shown that very few firms knew of the credit and large firms were substantially more likely to know of it than small firms. In the third section, a two-sector general equilibrium model of employment tax credits is presented. Regression results are presented in Section IV. The effect of the NJTC on employment growth and other variables is estimated. The possibility of simultaneity bias is tested and rejected. The fifth section examines the entire employment growth distribution contingent on firm characteristics and knowledge of the credit. The last section contains conclusions.

PB80-133960 PC **A02/MF A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
A Guide to Papers Citing Antitrust Cases Involving Standards or Certification.
Final rept.,
Carol Chapman Rawie. Dec 79, 22p NBSIR-79-1921

Since at least 1912, standards and certifications for products ranging from lumber to milk cans have been at issue in antitrust cases. Studying these cases may provide information about the economic effects of standards and certifications based on standards -- in particular, their impacts on competition and innovation. The paper describes several articles and reports which examine the antitrust history of standards. It is intended as a research tool to help economists and others decide which (if any) antitrust cases they should study to learn more about the economic effects of standards.

PB80-135445 PC **A16/MF A01**
Federal Trade Commission, Washington, DC. Bureau of Consumer Protection.
Report of the Presiding Officer on Proposed Trade Regulation Rule: Mobile Homes Sales and Service,
Raymond L. Rhine. 1980, 365p FTC/BCP-80-02

The report, based on hearings held in 1977, concerning F.T.C.'s Proposed Trade Regulation Rule on Mobile Home Sales and Service, contains the Presiding Officer's summary of the record, initial findings and conclusions relating to issues designated for consideration. The report also addresses closely-related issues that help furnish a clearer understanding of the mobile home industry. The record indicates that mobile home owners encounter numerous problems in attempting to obtain remedial action for defects in their homes. After a careful review and discussion of the record as a whole, the Presiding Officer concluded that, despite some short-term adverse effects on marginal firms, adoption of the Rule should result in substantial benefits to consumers and greater, more effective competition in the industry.

PB80-135601 MF **A01**
American Society of Planning Officials, Chicago, IL.
Local Capital Improvements and Development Management Literature Synthesis.
Jul 77, 126p HUD-0000036, HUD/PDR-272(2)
Contract HUD-H-2496
Paper copy available from the Sup. of Docs., Stock number 023-000-00451-8.

This report is a synthesis of the literature examining local governments attempts to plan and pro-

gram their capital facilities to carry out development objectives. Most textbooks and reports which consider the relationship between public improvements and private investment focus on sewers and highways. However, the factors that determine whether a community will grow, stabilize, or decline include complex economic, social, and environmental conditions. Isolating one factor as the determinant may be impossible and even unnecessary. Government may influence private development decisions through a broad range of techniques including advice, negotiation, public purchase, regulation, investment, and taxation. The literature repeatedly points out that while one or another method might be more critical at a particular time in a particular place, none of these actions can be separated from the decisions leading to community growth or change. In recent years, the legality of municipal actions to control capital improvements has been attacked by utilities, landowners, and others affected. Since the U.S. Supreme Court is unlikely to involve itself in these issues of planning law, the rulings of State courts will prevail, indicating that the State will be the intermediary between municipalities and those who oppose municipal decisions. Each chapter provides extensive reference notes. An overview of a typical city capital improvements program, notes, and a bibliography are appended.

PB80-135643 PC **A08/MF A01**
National Inst. for Advanced Studies, Washington, DC.
Public/Private Strategies for Involving Small Business in Community Economic Revitalization: A Policy Oriented Analysis.
Final rept.,
Carol Shapiro, Harry Tankin, James Fosdick, and Edna Kane. 24 Jul 78, 172p HUD-0000297
Contract HUD-H-2518

Commercial strip businesses play an important role in maintaining or restoring the economic and social vitality of urban neighborhoods. The problems facing these small businesses are studied through a literature review, interviews, and field visits in 15 cities. Small businesses are frequently undercapitalized and their owners have little training in modern management techniques. This makes such commercial strips extremely vulnerable to changes in economic circumstances. Small businessmen often do not belong to viable business associations. Banking and insurance companies frequently 'redline' declining neighborhoods, making it impossible for small firms located in these areas to get adequate financing or insurance. Active revitalization efforts have been undertaken by 11 cities: Baltimore, Md., Cleveland, Ohio, Hartford, Conn., Milwaukee, Wis., Philadelphia, Pa., Seattle, Wash., St. Louis, Mo., Providence, R. I., Portland, Ore., and Toledo, Ohio. These include storefront improvements; public improvements to streets, sidewalks, and lights; pedestrian amenities such as benches, trees, and trash cans; addition of adequate parking; and improved municipal services. In addition, management help was given through a variety of techniques. In Brooklyn, N.Y., New Orleans, La., and Oakland, Calif., private efforts were restoring neighborhood businesses while Phoenix, Ariz., was developing a neighborhood economy. Each effort is described in detail (charts compare these municipal efforts), and guidelines for future programs are developed based on these experiences.

PB80-135668 PC **A07/MF A01**
Institute for Government Business Research, Inc., Atlanta, GA.
Making Sense Out of Dollars: Economic Analysis for Local Government.
Eva C. Galambos, and Arthur F. Schreiber. Nov 78, 144p HUD-0000347

This handbook for local government decision-makers and staff provides a how - to guide for economic analysis and planning. The texts present basic economic concepts and methods that have the greatest relevance to local government. Applicable to cities, counties, or special districts of any size, step - by - step instructions for each method are provided to enable local government staffs to apply principles of economics to local problems. Following an executive summary, nine chapters present a selected method of economic analysis which are grouped into three problem areas: (1) understanding the local economy, (2) getting the most from each local government dollar, and (3) what is fair and who pays for whom. Each chapter begins by defining and describing a method of analysis and the major local government issues to which the method applies. The steps and procedures required to use the method are demonstrated on typical local government problems. Each chapter concludes with sections describing the difficulties and qualifications involved in applying the method, and the time, cost, and expertise likely to be required by local government staff in using the method. Suggested readings, checklists, and sample worksheets are included where appropriate. The methods covered include economic base analysis, gauging employment shifts and shares, labor market analysis, revenue projects, cost - benefit analysis, cost effectiveness analysis, pricing for local government, and cost - revenue analysis. Tabular data are included.

PB80-135916 PC **A04/MF A01**
Department of Housing and Urban Development, San Francisco, CA. Office of Program Planning and Evaluation.
Face-to-Face Single Family Mortgage Credit Processing: An Experiment in Service.
Evaluation rept.
Nov 76, 52p Rept no. HUD-0000516

A summary is provided of the findings of a controlled experiment which altered HUD's Single Family Mortgage Credit Processing procedures in three Region 9 Field Office locations: Reno and Las Vegas, Nev., and Los Angeles, Calif. The experiment was an effort to speed up processing time for both HUD mortgagees and HUD itself, to reduce the number of cases resubmitted to HUD for reprocessing, and to reduce processing costs for HUD. The major change involved conducting face - to - face, rather than through the mails, all communication between HUD and the lender. The major features were (1) mortgagees took more underwriting responsibility for formally prequalifying home buyers, (2) mortgagees made an appointment with HUD to process and review the case face - to - face at the HUD office, (3) mortgagees explained unclear items or furnished additional information to HUD, and (4) HUD's Mortgage Credit Examiner issued a firm commitment or rejection at the conclusion of the appointment. Four significant findings were found to be true, to varying degrees, for the three locations: (1) HUD's client mortgagees overwhelmingly endorsed the procedure and wanted it installed full - time; (2) the application time for firm commitment was speeded - up, and nearly all participants experienced time savings; (3) the changes to HUD procedures that came about as a result of the experiment were unpopular with most HUD mortgage credit staff; and (4) there were tangible benefits to HUD in that staff costs were reduced. Tabular data are provided.

PB80-135965 PC **A02/MF A01**
International City Management Association, Washington, DC.
Planning and Management '701', Plainfield, New Jersey: Industrial Stabilization and Development. A Strategy to Promote Industrial Development for Small and Medium Sized Cities.
Charles J. Schwabe. 1977, 20p HUD-0000524

Plainfield, N.J., has developed an Industrial Stabilization and Development (ISD) program built around stabilizing the city's existing industrial base and attracting new industrial residents to the city that can be especially useful to small and medium - sized cities. HUD '701' funding was used to identify the advantages Plainfield can offer to industry, and to match these advantages to specific types of industry. There are four key elements in the ISD program: (1) the city works with industry rather than focusing its entire effort toward attracting new industry; (2) the program is totally separate from any commercial revitalization and development and the staff works solely with industry; (3) in attracting new industry, Plainfield has set its sights on small scale, manufacturing, assembly and warehousing / transport types of industry; and (4) the city has developed a capacity within city hall to deal with the problems that go hand - in - hand with industrial development; economic development coordinators work daily with industries in their rezoning applications, building permit requests, and other issues that bring industrial residents in contact with the city. Background on the program aimed at halting industrial flight and attracting industry which could make use of the city's semi - skilled and unskilled labor force, its good transportation network, and its inventory of small, low profile horizontal structures is provided, as well as discussion of the program's beginning and implementation. The roles of the elected official, the city manager, and the city planner in the program are also examined. Plainfield evaluated the program and found that the benefits produced through the program -- stabilization of industry, development of new industry, establishment of good working relationships with real estate and financial communities -- are worth the considerable effort and long term commitment to improve the city's industrial base. Appendices contain the evaluation questionnaires and a sample of workshop seminar series publicity on ISD.

5D. History, Law, and Political Science

AD-A078 504/8 PC **A10/MF A01**
Naval Postgraduate School Monterey CA
The Making of Chinese Foreign Policy: Actors and Processes.
Master's thesis,
Freeland Henry Carde, III. Sep 79, 212p

This thesis focuses on the decision-making processes in Chinese foreign policymaking. Roles of institutions and individuals in these processes are explicated in different types of decisions. The information 'windows' through which China views the world are identified. Career backgrounds on foreign ministry officials and the diplomatic corps are presented, China's behavior in negotiations and crisis management are analyzed, and a case study of decisions leading to the 1979 Sino-Vietnamese war offered in example. (Author)

AD-A078 650/9 PC **A06/MF A01**
Naval War Coll Newport RI Center for Advanced Research
Indian Ocean NALT: An Exercise in the Revision of U.S. Foreign Policy.
Final rept.,
J. F. Giblin, Jr. Jun 79, 103p

The initiation of Naval Arms Limitation Talks (NALT) with the Soviet Union in June 1977 was significant because it represented a clear departure in U.S. foreign policy for the Indian Ocean. Reviewing the events that led to the Indian Ocean NALT, this study analyzes NALT by identifying the rationale for the apparent shift in US Indian Ocean policy and examining certain issues that may have confronted the US and the USSR during their negotiations. (Author)

AD-A078 724/2 PC **A05/MF A01**
Army War Coll Strategic Studies Inst Carlisle Barracks PA
Forecasting Strategic Issues, 1980-2000.
Special rept.,
John F. Scott. 10 Dec 79, 76p

An intermediate range of theory and perception for forecasting conflict is characteristic of international relations. Method is weak or absent. A proposal 'issues' approach adapts the technique of argument to explain assumptions and to search for new and unexpected developments. A case study of international interdependence is followed by methodological conclusions. Several summary issues are offered in an Annex and an Appendix as illustrations of further uses of the suggested approach. (Author)

AD-A078 910/7 PC **A08/MF A01**
Army Military Personnel Center Alexandria VA
State Court Reform: Progress and Problems.
Final rept.,
Lionel Hector. 21 Dec 79, 170p
Master's thesis.

This work discusses the status of state court reform in the United States ostensibly as of 1978. (Some data are only as current as 1976.) It divides court reform into three areas for study: (1) organizational restructuring of the courts themselves; (2) organizational restructuring and consolidation of

the management and administrative functions; and (3) the consolidation of the fiscal functions of the state courts. The study concludes that state court reform has been extraordinary since 1940 but that indications are that the momentum is waning and that those responsible for such reform must become aware of this phenomenon and attempt to counter it through long range planning. (Author)

AD-A078 936/2 PC A06/MF A01
Michigan State Univ East Lansing
Towards a General Forecasting Model for Crisis Monitoring: Predicting Events in China as Test Case.
Final rept.,
Richard P. Y. Li. 15 Oct 79, 123p
Contract N00014-78-C-0510, DARPA Order-3612

This report summarizes the development and testing of the CEWMFC interactive forecasting system for monitoring political crises and policy changes in China. The first chapter presents an overview of the project, discusses its objective and its major accomplishments and delineates the structure of the report. The second chapter discusses the philosophy and the design of the CEWMFC System, and describes the forecasting model and the modeling strategy the system employs. The third chapter delineates the structure and function of the CEWMFC system. The fourth chapter summarizes the results of sensitivity analysis and forecast reliability tests performed on the CEWMFC system, and defines the hypotheses and the indicators employed in data analyses. Appendix A then presents a technical description of the mathematical foundation of the CEWMFC system. Appendix B describes the coding procedure for constructing the Chinese crisis and policy indicators. Appendix C describes the statistical models used in the data analyses. (Author)

NUREG-0648 PC A04/MF A01
Nuclear Regulatory Commission, Washington, DC. Office of the General Counsel.
Study of the Nuclear Regulatory Commission's Appellate System,
L. Bickwit, M. Malsch, S. Ostrach, and K Christenson. Jan 80, 60p

The study examines: (1) the history of the appeal boards, (2) the role the appeal boards play in the current adjudicatory process, (3) legislative trends relating to use of intermediate appellate bodies for agencies, (4) the adjudicatory systems at other agencies, and (5) the current workload of the appeal boards and the Commission. The final section of the study discusses the available options for change and makes recommendations for potential improvements in the functioning of the present appellate system.

PB80-122195 PC A05/MF A01
New York State Assembly Science and Technology Staff, Albany.
The Politics of Legislation in New York State: How a Bill Becomes a Law. (Volume III),
Abdo I. Baaklini, and Charles S. Dawson. 1979, 100p ISBN-0-915194-04-X, NSF/RA-790060
Grant NSF-ISP75-18374
See also Volume 1, PB80-108194. Prepared in cooperation with State Univ. of New York at Albany. Comparative Development Studies Center. Library of Congress catalog card no. 78-22606.

The volume focuses on the process by which six bills became New York state laws in 1975 And 1976. The analytical framework is comparative in order to provide an understanding not only of particular factors which signalled the success of each bill, but also of the inherent organizational and political links in New York State's legislative process which affect every bill. The methodology seeks to clarify that while there are often consistent underlying factors arising out of the formal structure which give significant power to individuals in the legislature that allows them to greatly influence legislative outcomes (i.e., laws or dead bills), mercurial and ambiguous components remain which can only be identified by considering the political choice-making process as a whole. Analyses of how the following six bills became New York State law are included: (1) the Occupational Therapy Bill; (2) The Civil Service Bill; (3) the New York City Education Bill; (4) the Upstate Property Tax Exemption Bill; (5) the New York City Property Tax Exemption Bill; (6) the Savings Bank Bill. The workings of the New York State Legislature and the many roles it plays are explained in a discussion of its powers and limitations, its composition and structure, and its rules and procedures. The legislative process is outlined along with explanations of bill referral, bill screening, bill shaping, and bill passage. A selected legislative glossary and a bibliography are included.

5E. Human Factors Engineering

AD-A078 649/1 PC A02/MF A01
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Legibility of Military Symbols on a Cathode Ray Tube Display,
Carol McCann. Sep 79, 24p Rept no. DCIEM-79-R-38

The legibility of selected military map symbols on a CRT display was determined by testing a symbol set of nineteen primary role descriptors symbols for military units using a tachistoscopic presentation technique. Simpler geometric symbols composed of fewer line components were more quickly recognized than complex ones, and were also the source of fewer errors. Symbols with circular or curved components were more likely to be confused with each other than with symbols composed of linear components. (Author)

AD-A078 805/9 PC A05/MF A01
Houston Univ TX
Preliminary Activities in the Development of MX Maintenance Control through Use of a Design Morphology.
Interim technical rept. 1 Oct 78-30 Sep 79,
Benjamin Ostrofsky. Sep 79, 96p AFOSR-TR-79-1279
Contract F49620-77-C-0116

This study is part of a continuing effort to improve aerospace system design and to consider human resources and logistics properly in the design procedures. The study is being accomplished through the use of a structured, design decision process. The problem approached is the Fault Detection and Dispatch (FDD) activities of Maintenance Control in the Operational Control Center of a prototype MX system. By approaching a highly unstructured problem the design morphology used was able to show clearly the required elements of the problem in their true perspective. Hence the role of the operators and other personnel become clear. In this research the problem was defined and basic FDD requirements identified. A computerized maintenance model was developed and tested, and the elements of the protective structure location were defined for impact upon the emerging FDD system. Three basic scenarios for MX maintenance were identified and 180 candidate systems developed for FDD. A multi-attribute criterion function was approached for the evaluation of the candidate systems. This criterion function will be developed in subsequent research and the optimal candidate chosen analytically. A list of desireable trade studies was developed and subsequent activity will clarify Maintenance Control tasks and information flow. (Author)

5G. Linguistics

AD-A078 420/7 PC A05/MF A01
Massachusetts Inst of Tech Cambridge Artificial Intelligence Lab
Instrumental with and the Control Relation in English,
Beth C. Levin. Nov 79, 92p Rept no. AI-M-552
Contract N00014-75-C-0643

This paper explores the nature of the underlying representation of a sentence, that representation formulated to make explicit the semantic structure of a sentence as a description of an event. It argues that the typical conception an underlying representation as a predicate-argument representation, exemplifie- in systems of case and thematic relations, must be modified. An underlying representation must include semantic relations between noun phrases as well as the predicate-argument relations of noun phrases to a verb. An examination of instrumental with will be used to motivate and justify this revision. In particular, an account of instrumental with requires the introduction of the control relation, a relation between two noun phrases. (Author)

5H. Man-Machine Relations

AD-A078 329/0 PC A03/MF A01
Illinois Univ At Urbana-Champaign Engineering-Psychology Research Lab
The Processing Resource Demands of Failure Detection in Dynamic Systems.
Technical rept.,
Christopher D. Wickens, and Colin Kessel. Jan 79, 27p EPL-79-1/AFOSR-79-1, AFOSR-TR-79-0684
Grant AFOSR-77-3360

A conception of human attentional resources is presented that describes these resources, not as an undifferentiated pool of capacity, but as partitioned into separate structure-specific reservoirs related to the processes of encoding, central processing and responding. An experiment is then described in which subjects detected dynamic system failures, either while actually tracking the control dynamics (manual mode), or while passively observing an autopilot controlling the dynamics (automatic mode). Failure detection, the primary task was performed alone, and with each of two structurally different loading tasks: mental arithmetic and a critical instability tracking task. Manual detection and primary task tracking were affected by the critical tracking task but not by mental arithmetic. The opposite pattern of interference was found for automatic detection. Assuming that manual and automatic detection depend upon different information sources, these results are shown to be compatible with the concept of structure-specific resources. (Author)

N80-14697/0 PC A02/MF A01
National Aeronautics and Space Administration, Langley Station, VA. Langley Research Center.
Preliminary Investigation of Pilot Scanning Techniques of Dial Pointing Instruments.
R. L. Harris, Sr.. Nov 79, 22p NASA-TM-80079

Two pilots' methods of looking at instruments with needle pointers in a fixed base helicopter simulation were observed. A total of 45 runs were analyzed for each pilot. The data indicated that two apparently different techniques were being used; one looking at the needle point, the other looking at a fixed spot on the instrument and reading the needle direction parafoveally. The latter technique is found to be somewhat faster with both pilots accomplishing the flying task.

N80-14715/0 PC A03/MF A01
National Aeronautics and Space Administration, Washington, DC.
Technologies for the Handicapped and the Aged.
T. E. Bell. Jul 79, 48p NASA-TM-80842

Examples of the technology transferred from advanced aerospace research projects to the needs of the handicapped and the elderly are presented. The booket is divided into six sections, concentrating on technology respectively applied to the heart, limbs, senses, diagnostic tools, treatment and overall lifestyle. Within each section, the projects are organized roughly in chronological order, from those already completed and in the marketplace to those on the engineer's drawing board or still a concept in a physician's mind.

5I. Personnel Selection, Training, and Evaluation

AD-A078 377/9 PC A06/MF A01
Rand Corp Santa Monica CA
Labor Substitution in the Military Environment: Implications for Enlisted Force Management.
Interim rept.,
Mark J. Albrecht. Nov 79, 107p Rept no. RAND/R-2330-MRAL
Contract MDA903-77-C-0108

This report analyzes the potential for cost savings associated with the substitution of first term and career personnel at the occupational level. Its

analysis of the measurement and evaluation of labor productivity in the military enviroment makes it possible to assess the potential for making first term/career substitutions. For this research, actual productivity measures and work unit background data were used to estimate the parameters of a two-tiered constant elasticity of substitution (CES) labor aggregation function. The results of the analysis indicate that higher skill occupations overutilize first term labor inputs and lower skill occupations underutilize them. Thus, a redistribution existing first term and career personnel within the set of occupations analyzed would mean almost a $20 million annual cost savings, with no loss of overall effectiveness. The findings of this research suggest that the attainment of currently stated objective force goals would be associated with a substantial reduction in overall effectiveness. (Author)

AD-A078 426/4 PC **A03/MF A01**
Air Force Human Resources Lab Brooks AFB TX
Platform Motion Contributions to Simulator Training Effectiveness: Study III - Interaction of Motion with Field-of-View.
Final rept.,
Mark Nataupsky, Wayne L. Waag, Douglas C. Weyer, Robert W. McFadden, and Edward McDowell. Nov 79, 31p Rept no. AFHRL-TR-79-25

The objective was to determine the effects of platform motion cueing, visual field of view (FOV), and their interaction upon learning in the simulator and as subsequent transfer of training to the aircraft for basic contact maneuvers in the T-37 aircraft. A transfer-of-training study design was used in which student pilots were initially trained in the Advanced Simulator for Pilot Training (ASPT) and subsequently evaluated on their first sortie in the T-37 aircraft. Each student received training under one of four simulator configurations: (a) full platform motion (six degrees of freedom), full FOV (300 degrees horizontal by 150 degrees vertical; (b) full platform motion, limited FOV (48 degrees by 36 degrees vertical); (c) no platform motion, full FOV; and (d) no platform motion, limited FOV. For the ASPT pretraining phase, scores from the automated performance measuring system and overall instructor pilot ratings were used for analysis. For the T-37 evaluation sorties, the overall instructor pilot ratings, as well as individually recorded flight parameters, were analyzed. These data provided no conclusive evidence of differential transfer effects resulting from platform motion cueing, size of the visual FOV, or their interaction. As such, these data provide support for previous findings that platform motion cueing does not significantly enhance the transfer of learning for basic contact tasks in the T-37 aircraft. It would seem that the impact of peripheral visual cues for initial acquisition is not critical. Furthermore, no convincing evidence was found indicating increased transfer using platform motion in conjunction with a narrow FOV visual scene.

AD-A078 427/2 PC **A05/MF A01**
Air Force Human Resources Lab Brooks AFB TX
Pre-Enlistment Person-Job Match System.
Final rept.,
William H. Hendrix, Joe H. Ward, Jr., Manuel Pina, Jr., and Donald L. Haney. Sep 79, 97p Rept no. AFHRL-TR-79-29

Research discussed in this report involved the developmment of a computer-based assignment system which became operational Air Force-wide 1 November 1976. The Person-Job Match System was the computer algorithm which matched potential recruits with available jobs. This algorithm, when operationally implemented, became the assignment algorithm of the Air Force Advanced Personnel Data System's Procurement Management Information System (APDS-PROMIS). This report presents the assignment concept, methods of combining multiple objectives, the conceptual payoff equation, baseline performance data, and future directions anticipated. (Author)

AD-A078 444/7 PC **A12/MF A01**
Personnel Decisions Research Inst Minneapolis MN
Measuring Motivation, Morale and Job Satisfaction in Army Careers.
Final rept.,
Walter C. Borman, Paul D. Johnson, Stephan J. Motowidlo, and Marvin D. Dunnette. 30 May 75, 269p ARI-RN-79-30
Contract DAHC19-73-C-0025

This report describes an extensive investigation of the constructs of motivation, morale, and job satisfaction as they relate to enlisted personnel in the United States Army. A comprehensive literature review helped to delineate definitions of the three constructs and to identify motivation and satisfaction inventories to be tried in the field. In addition to existing inventories, new measures also were developed for field testing. Since the literature review revealed almost no measures explicitly designed to measure morale, another phase of our research was devoted to a series of workshops where Army officers and enlisted personnel recounted actual episodes that they perceived to be indicative of different levels of unit morale. These episodes were used to define eight dimensions of unit morale and to develop scales for rating a unit's morale on those dimensions (Community Relations; Teamwork and Cooperation; Reactions to Adversity; Superior-Subordinate Relations; Performance and Effort; Bearing, Appearance and Military Discipline; Pride in Unit, Army, and Country; and Use of Off-Duty Time). The questionnaires, inventories and rating scales were field tested by administering them to 466 enlisted men (representing 104 platoons and 16 companies) in the Eighth Army (Korea), 614 soldiers (representing 47 platoons and 16 companies) in the Seventh Army (Germany) and 126 men in Minnesota National Guard units.

AD-A078 498/3 PC **A04/MF A01**
General Research Corp McLean VA
A Survey of USAREUR Entry Level Skills of the 11B Infantryman.
Technical rept.,
Benjamin Bonner, and John F. Hayes. May 79, 70p ARI-TR-79-B3
Contract DAHC19-75-C-0009

The extent to which recent AIT graduates, newly assigned to USAREUR infantry units, possessed primary combat arms skills was investigated. Skill levels of randomly selected 11B infantrymen just out of BCT/AIT were assessed by four methods. The men were administered a self-assessment inventory, a written skills qualification test, and a hands-on skills qualification test which covered some or all the 54 individual soldier tasks 1 on which they received training during their BCT/AIT training cycle. Randomly selected squad and platoon leaders, NCOs and officers, were also asked to assess the deficiencies of incoming 11B personnel, and the difficulty in teaching the 54 tasks to soldiers in their unit. In addition, leaders reported when new personnel performed MOS tasks in the unit, the events or exercises during which these tasks are performed, and what changes should be made at the schools in regard to the training on the individual tasks. Comparisons were made of the results from the four methods of skill assessment: self-assessment, leader assessment, written test, and hands-on test. The majority (61 to 98%) of incoming 11B soldiers recalled being trained and tested on 50 of the 59 individual soldier tasks listed in the draft FM during their BCT/AIT training cycle.

AD-A078 499/1 PC **A10/MF A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
A Prototype Crew Drills Training Program for XM1 Tank Gunnery: Company Commander's Manual.
Final rept. Oct 78-Oct 79,
Ronald E. Kraemer, and Donald M. Kristiansen. Nov 79, 209p Rept no. ARI-RP-79-17

This report presents a prototype XM1 tank gunnery crew drills training program designed to support ongoing ARI research concerned with the design and development of Armor training structures. This particular research was focused on the design of collective training components for Armor gunnery tasks, and is responsive to the needs arising from the introduction of the XM1 main battle tank into the Armor inventory. Two major objectives were accomplished. First, fourteen crew drills were identified as representative of basic XM1 tank gunnery engagements, and behaviorally analyzed. Performance prescriptions detailing both individual and crew gunnery behaviors were developed for each crew drill requirement, along with performance checklists for assessing crew performance. Administrative, training, and evaluation specifications designed to structure training were also developed. Second, a collective training model was formulated that specified the training approach and supporting systems necessary to manage and quality control crew drill training. A training matrix, designed to promote intermediate and advanced tank gunnery proficiency, and training selection algorithms, designed to aid training assignment, were also developed as part of the training program. (Author)

AD-A078 595/6 PC **A05/MF A01**
Caci Inc-Federal Arlington VA
Productivity Improvement through Incentive Management: Progress Toward Developing a New Management Resource.
Final technical rept. 6 Oct 78-30 Sep 79,
Bertam I. Spector, and John J. Hayes. 30 Sep 79, 94p Rept no. CAC0002AE
Contract MDA903-79-C-0009, DARPA Order-3666

This report defines and identifies incentive management (rewards-for-performance) strategies that have been and can be employed to stimulate worker productivity. Recent theoretical and empirical studies are reviewed to evaluate the relative effectiveness on performance. An inventory of popular incentive systems is compiled and a taxonomy that classifies incentives is designed. A case study of a large-scale productivity improvement effort at a major U.S. Army depot is presented. Finally, a computer-based management aid is designed and a demonstration package developed to display how workforce supervisors, organizational development specialists, and key installation management personnel can tailor incentive plans to the specific needs of varied organizations and job functions. Results indicate that incentive management strategies are effective tools to improve worker productivity and maximize manpower cost savings but specific tailored plans are required to meet special contingencies of different organizations and tasks.

AD-A078 667/3 PC **A04/MF A01**
R-K Research and System Design Malibu CA
Taxonomic Approaches to Enlisted Occupational Classification. Volume I.
Final rept. Dec 76-Feb 78,
Diane M. Ramsey-Klee. Dec 79, 55p NPRDC-TR-80-7-VOL-1
Contract N00123-77-C-0021

Task inventory data for five representative Navy enlisted ratings were studied to (1) define the taxonomic structure underlying the design of the Navy Occupational Task Analysis Program's task inventory booklets and (2) develop alternative taxonomic methodologies that will extend the usefulness of the task inventory data and shorten the task inventories, thereby reducing time demands on operational units during their administration. The following ratings were studied: Aviation Boatswain's Mate (AB), Aviation Machinist's Mate (AD), Electronics Technician (ET), Torpedoman's Mate (TM), and Yeoman (YN). Surveying the literature showed that no published taxonomic methodology could be applied directly to improve the task inventory booklets, but elements of the Manual of Navy Enlisted Manpower and Personnel Classifications and Occupational Standards were incorporated into a composite content analytic methodology. Additionally, a clustering methodology was developed. Applying the content analytic methodology to the task inventory data demonstrated that this procedure can be used effectively to compare Navy ratings, relate task analysis data to occupational standards, and systematically generate task statements. Applying the clustering technique to the same data showed that while some of the informal job titles requested in the inventories correspond to well-defined clusters derived from task statements and thus appear to be universally understood, others do not. This suggests that the job title section should be dropped from the task inventory booklets, since the job titles serve no useful purpose that justifies their identification for central management use. (Author)

AD-A078 685/5 PC **A03/MF A01**
Training Analysis and Evaluation Group (Navy) Orlando FL

An Incremental Costing Method for Resource Allocation in Navy Training.
Technical memo.,
James M. Corey, and William M. Swope. Nov 79, 31p Rept no. TAEG-TM-79-7

When deciding where a proposed incremental level of recruit training should take place, the decision maker should ascertain the cost of the alternatives and select that site where the required training can be done most efficiently. This report (a) demonstrates that incremental costing is the appropriate approach to use when estimating the relative costs of the alternative training sites and (b) develops one method for obtaining the incremental costs of recruit training. 1978 data for recruit training at the Naval Training Center, Orlando, were used to exemplify the method. (Author)

AD-A078 698/8 PC **A06/MF A01**
Air Force Occupational Measurement Center Randolph AFB TX
Television Equipment Repair Career Ladder, AFSCs 30535, 30455, 30475, 30496, and CEM Code 3010C.
Occupational survey rept.
Oct 79, 109p

The Television Equipment Repair career ladder job inventory was administered during the period December 1978 through May 1979. Survey results are based on responses from 522 incumbents, sampling 66 percent of assigned 304X5 personnel. Seven distinct groupings were identified: TV Production Personnel, Closed Circuit Television (CCTV) Personnel, TV Production Equipment Maintenance Personnel, Videotape Recorder Maintenance Personnel; and supervisor, quality control, and training groups. Differences occurred based on whether member performed either CCTV repair or TV production equipment maintenance, and the amount of time spent on supervision. The Television Equipment Repair career ladder structure analysis highlights the large division among incumbents who performed CCTV functions, those who performed TV productioin equipment maintenance, and those who primarily supervised. Also, this analysis identified small groups which performed VTR maintenance, quality control inspection, and instruction. TV Production Personnel performed one of the most unique jobs identified, spending a great deal of time on operating and cleaning tasks rather than maintaining TV equipment.

AD-A078 744/0 PC **A03/MF A01**
Air Weather Service Scott AFB IL
Forecast Skill Score Test.
Final rept. 1 Oct 77-31 Mar 78,
William F. Johnson, Arthur C. Kyle, and Paul B. Knutson. Dec 78, 35p Rept no. AWS/TN-79/005

This publication contains results of test of different skill scores to be used by the Air Weather Service (AWS). It also presents the first organized attempt by AWS units to issue probability forecasts. This test was conducted from 1 Oct 77 - 31 Mar 78.

AD-A078 769/7 PC **A04/MF A01**
Human Engineering Lab Aberdeen Proving Ground MD
U.S. Army Human Engineering Laboratory Female Artillery Study.
Final rept.,
Frank R. Paragallo, Jr., William J. Dousa, Jr., and Donald L. Lince. Oct 79, 52p Rept no. HEL-TM-18-79
See also Rept. no. HEL-TM-9-79, AD-A073 742.

The US Army Human Engineering Laboratory conducted the female artillery study to evaluate the female soldiers' capability to perform specific tasks associated with loading, laying, and firing selected howitzers. The study showed that female soldiers can successfully attain published rates of fire for the 105mm M101A1 and 155mm M114A1 howitzers. (Author)

AD-A078 893/5 PC **A03/MF A01**
Army Behavior and Systems Research Lab Arlington VA
Research to Predict Cadet and Officer Performance,
William H. Helme. May 69, 30p Rept no. BESRL-RESEARCH STUDY-69-10

This report is about the development of instruments and procedures for the selection or early identification of potential officers and of individual assets relevant to effective performance of combat, technical, and administrative duties; application of the overall and differential measures developed in officer procurement and assignment programs--OCS, USMA, ROTC--so as to enhance the quality of performance and career motivation of the Army's officers.

AD-A078 955/2 PC **A03/MF A01**
Purdue Univ Lafayette Ind Dept of Psychological Sciences
Effects of Selection Agent and Leader Origin on Leader Influence and Group Member Perceptions.
Interim rept.,
Patrick A. Knight, and Howard M. Weiss. Nov 79, 31p Rept no. 3
Contract N00014-78-C-0609

The effects of the expertise of the agent of leader selection (expert vs. non-expert) and leader origin (internal promotion vs. external appointment) on leader effectiveness were examined in a laboratory setting. Results showed that leaders chosen by a competent agent of selection where themselves seen as having greater task expertise and were better able to influence the decisions of group members than were leaders selected by a less competent agent. The origin of the leader had no effect upon either perceptions of the leader or the leader's influence. These results are discussed in terms of their implications for leader selection in organizations and the importance of analyzing extra dyadic factors which influence leader - subordinate relations. (Author)

ED-169 886 Not available NTIS
Council for Exceptional Children, Reston, VA.
A Plan for Application of Communications Satellites in Education (Special Education Satellite Project), The Final Report/Proposal. Technical and Cost Proposals.
31 Mar 78, 416p
Contract NIE-400-77-0110
Portions of this document are not fully legible. For related documents, see IR 007 075, ED-167 182. Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This project was concerned with the utilization of communications satellites to assist in the implementation of P.L. 94-142, which deals with discrimination against the handicapped and provision of public education for handicapped children. The results of a national survey on personnel development needs of state education agencies are reported; responses to a questionnaire assessing the need for satellite-delivered programming in special education are considered; and the rationale, objectives, target states, and target populations for initial delivery efforts in three program areas--technical assistance, direct service to gifted and talented students, and community awareness/parent education--are outlined. A work breakdown structure, a narrative of work, a PERT diagram, a project framework, and position descriptions for all program, technical, and management areas are provided. Appendices include letters of support, a bibliography, and a glossary.

ED-169 887 Not available NTIS
American Dietetic Association, Chicago, IL.
Planning for Applications of Communications Satellites in Education,
William K. O'Connell. 31 Mar 78, 234p
Contract NIE-400-77-0106
For related documents, see IR-007 073; ED-167 182. Portions of this document are not fully legible. Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report of a project to develop and test a prototype system for the delivery of continuing education (CE) to two defined target groups of registered dietitians includes user needs, alternative approaches, the operational plan, the management plan, and personnel. Major tasks involved in the project are described: (1) development, implementation, and evaluation of 36 competency-based CE programs: (2) progression toward an operational communication satellite system; (3) utilization of networks for the necessary communication satellites through institutional relationships already initiated; (4) establishment of a program advisory committee to determine appropriate content areas for CE delivery; and (5) marketing consultation from satellite business systems. Appendices include Delphi process participants, STARDATE questionnaires, Focus Group instrument survey on CE needs, assumptions and sources used for cost analysis, satellite footprint maps, STARDATE project description, assessment of interpersonal skills, earth station site maps for experimental areas, and letters of support.

ED-169 890 Not available NTIS
Wisconsin Univ.-Parkside, Kenosha. Univ. Libraries.
Bibliographic Instruction Program.
1978, 56p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This document presents individual program and instruction objectives for students, faculty, community residents, and staff involved in the bibliographic instruction program at the Library/Learning Center of the University of Wisconsin-Parkside. A basic responsibility of the Library/Learning Center is to instruct the university community in the effective identification and use of information resources relevant to its needs and interests. Instructional objectives have been developed for each community group based upon the special needs of the group as identified or perceived by the library staff. Written objectives developed to identify the skills to be taught and objectives for each user community have been divided into levels of instruction based upon user sophistication. Currently, there are seven methods or programs of bibliographic instruction: (1) orientation, slide/tape, (2) printed guides, (3) basic library skills workbook, (4) advanced workbook, (5) course-integration, (6) English 100, and (7) discovering research for college-bound high school students. Evaluation of the programs is carried out through informal discussion, formal evaluation forms, and a skills test to evaluate learning. Cost and budgetary information (pages 65-69) is not included.

ED-169 894 Not available NTIS
Mankato State Univ., MN.
Development of a Self Instructional Course for Library Orientation at Mankato State University.
Master's thesis,
Sandra K. Ready. Dec 78, 163p
Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The purpose of this study was to design, construct, and evaluate a self-instructional program of study for basic bibliographic research skills at Mankato State University Memorial Library, allowing for flexibility of time scheduling and previously acquired library skills. An existing syllabus for teaching the use of media resources and services at Mankato State University was divided into six distinct instructional units: (1) general introduction; (2) classification of materials and using the card catalog; (3) reference materials; (4) indexes, abstracts, and periodical materials; (5) United States Government Publications; and (6) special collections. Self instructional materials for each unit were written and produced. A pilot study was run to test informally the self-instructional materials to determine their general effectiveness when used as a sequenced course, and also as individual units out of sequence and independent from one another. Although involving a small number of students, the pilot study demonstrated that the materials could be used both as self-instructional packages and as independent units in large group presentations to teach library skills. The packages could be used either in a predetermined sequence, or in random order, with equal success. The program packages appended include scripts for self-instructional slide/tape presentations; however, nonprint materials are not included in ERIC.

ED-169 895 Not available NTIS
Environmental Information Resources for a Course,
Marta Dosa. 1974, 20p

Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210

An outline for a library science course in environmental information is provided, as well as selected information sources and reference materials. The outline includes historical and philosophical perspectives, information users and behavior, information resources, institutions and individuals as information producers, information systems and processes, and international information exchange. The selected bibliography lists monographs, journal articles, reference works, indexing and abstracting publications, current awareness services, review series, yearbooks and annuals, retrospective bibliographies, and directories of institutions.

ED-169 897 Not available NTIS
Bureau of School Systems, Washington, DC. Office of Libraries and Learning Resources.
School Library Resources, Textbooks, and Other Instructional Materials. Title II, ESEA. Strengthening Instruction in Science, Mathematics, Foreign Languages, and the Humanities and Arts; Title III, NDEA.
Annual rept. no. 5.
1969, 58p
Pub. in the Federal-State Partnership for Education. Portions of this document are not fully legible. For related documents, see IR-007 166-171, IR-007 180-183 and ED-082 382, ED-086 215.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Two federal educational programs are covered in this annual report for FY 1969: Title II of the Elementary and Secondary Education Act and Title III of the National Defense Education Act. The first report describes how the 50 states, the District of Columbia, Guam, Puerto Rico, the Trust Territory of the Pacific Islands, the Virgin Islands, and the Department of the Interior (operating schools for Indian children) utilized Title II funds for the improvement of educational quality and opportunity through increased school library resources, textbooks, and other instructional materials. Also covered are staffing patterns for the first three years of the program, special purpose grants, participation of private school children and teachers, program coordination, accessibility of loaned materials, management activity, school media personnel, staff development, selection of materials, standards for instructional materials, and program evaluation. The second report describes the use of Title III funds to strengthen instruction in science, mathematics, foreign languages, and the humanities and arts through the purchase of equipment and materials, minor remodeling, and through state supervisory and related services. Major topics include priorities, program coordination, adequacy of equipment and reimbursement, improved instructional patterns and teaching techniques, curriculum improvement, student achievement, and program evaluation.

ED-169 898 Not available NTIS
Bureau of School Systems, Washington, DC. Office of Libraries and Learning Resources.
School Library Resources, Textbooks and Other Instructional Materials: Title II, ESEA (and) Strengthening Instruction in Science, Mathematics, Foreign Languages and the Humanities and Arts: Title III, NDEA. Annual Report, 1970.
1970, 56p
Best copy available. Reprint from: State Departments of Education and Federal Programs. For related douments, see IR-007 166-171, IR-007 180-183 and ED-082 382, ED-086 215.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Annual reports of two federal education programs for FY 1970 comprise this document: Title II of the Elementary and Secondary Education Act and Title III of the National Defense Education Act. Both reports describe how the 50 states, the District of Columbia, Puerto Rico, Guam, American Samoa, the Virgin Islands, the Trust Terriroty of the Pacific Islands, the Department of the Interior (for schools operated by its Bureau of Indian Affairs), and the Department of Defense (for overseas dependents' schools) utilized their program funds. Areas covered in the first report include standards for instructional materials, selection of materials, effect on curriculum and teaching methods, special-purpose grants, special programs, program evaluation, state and local needs for instructional materials and management, improved management techniques, accessibility of loaned materials, coordination with other programs, participation by private school teachers and children, and staffing and staff development. The major sections of the second report delineate state education agency services to local education agencies, priorities, coordination with other programs, reimbursement and adequacy of equipment and materials, evidence of improved instruction (instructional patterns/techniques, curriculum, student achievement), evaluation, and data on fund sources and expenditures. Both reports provide supportive statistics.

ED-169 899 Not available NTIS
Office of Education, Washington, DC.
School Library Resources, Textbooks, and Other Instructional Materials: Title II, ESEA. Annual Report, 1971.
1971, 100p
For related documents, see IR-007 166-IR-007 171, 180-183 and ED-086 215.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Based on the financial and narrative reports submitted by the States and other areas to the U.S. Office of Education, this annual report describes the operation of the Elementary and Secondary Education Act Title II Program (ESEA Title II) in FY 1971 in the 50 states, the District of Columbia, Puerto Rico, the Virgin Islands, American Samoa, Guam, the Trust Territory of the Pacific Islands, and areas under the jurisdiction of the Bureau of Indian Affairs. The financial reports show expenditures for state administrative functions and local education agency expenditures for the acquisition of school library resources, textbooks, and other instructional materials; these figures reflect for the first time the effects of the provision enabling the carry-over of funds into a succeeding fiscal year. The narrative reports describe management practices in the administration of the program, developments and accomplishments of the program in support of curriculum and instruction, including contributions to The Right To Read Program and services to private school children and teachers, and critical needs still existing. Six tables provide supportive statistics.

ED-169 900 Not available NTIS
Office of Education, Washington, DC.
School Library Resources, Textbooks, and Other Instructional Materials: Title II, ESEA. Annual Report, 1973.
1973, 105p
For related documents, see IR-007 166-171, IR-007 180-183 and ED-086 215.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Based on the narrative reports submitted to the U.S. Office of Education, this annual report describes the operation of the Elementary and Secondary Education Act Title II Program (ESEA Title II) in Fy 1973 in the 50 states, the District of Columbia, Puerto Rico, the Virgin Islands, American Samoa, Guam, the Trust Territory of the Pacific Islands, and areas under the jurisdiction of the Bureau of Indian Affairs. The narrative reports describe management practices in the administration of th program, developments and accomplishments of the program in support of curriculum and instruction, including its commitment to the Right to Read Program and services to private school children and teachers, and the critical needs still existing. Six tables provide statistics on expenditures, grants, and the number of State Department of Education personnal assigned to the program for the fiscal years 1966-1972.

ED-169 901 Not available NTIS
Office of Education, Washington, DC.
School Library Resources, Textbooks, and Other Instructional Materials: Title II, ESEA. Strengthening Instruction in the Academic Subjects: Title III, NDEA. Annual Report, 1974.
1974, 162p
For related documents, see IR-007 166-171, IR-007 180-183 and ED-082 382, ED-086 215 and ED-101 467.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This document contains the annual reports for two federal educational programs: Title II of the Elementary and Secondary Education Act (ESEA Title II) for FY 1974 and Title III of the National Defense Education Act (NDEA Title III) for FY 1973 and 1974. Derived from annual reports which were submitted by state educational agencies and other jurisdictions to the U.S. Office of Education, each report consists of a financial status report, showing expenditures by category during the previous fiscal year, and a performance report, which provides a comparison of actual accomplishments to established goals, supplies some statistical information, gives reasons why established goals could not be met, and other pertinent information. A bibliography of publications on the ESEA Title II Program and the financial status and performance report forms used in both programs for FY 1974 are included. Seventeen tables supply statistics for the ESEA Title II program relating to funds, number of professionals assigned, number of teachers and children participating, expenditures for school library resources, textbooks, and other instructional materials: ten tables provide similar statistics for the NDEA Title III program, including equipment expenditures in its seven academic areas and loans granted during the fiscal year.

ED-169 902 Not available NTIS
Office of Education, Washington, DC.
School Library Resources, Textbooks, and Other Instructional Materials. Title II, ESEA: Strengthening Instruction in the Academic Subjects: Title III, NDEA. Annual Report, 1975.
1975, 93p
For related documents, see IR-007 166-170, IR-007 180-183 and ED-082 382, ED-086 215.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Annual reports of two federal educational programs for FY 1975 comprise this document: Title II of the Elementary and Secondary Education Act (ESEA Title II) and Title III of the National Defense Education Act (NDEA Title III). Compiled from the performance and financial reports submitted by state educational agencies to the U.S. Office of Education, the first report includes both narrative and statistical data and provides a comparison of actual accomplishments to established goals, reasons for slippage where established goals were not met, and other pertinent information. Examples from the states and areas cited to illustrate various topics covered by the report are arranged by the geographic regions (Northeast, Southeast, Upper Midwest, Mid-Continent, Western). No data tables are provided. Compiled in the same manner as the Title II report, the NDEA Title III report describes the general and specific objectives of states for the implementation of the program, management activities undertaken to achieve those objectives, and the relative success met. The report also discusses the cumulative impact of NDEA Title III on education and describes loans to private and nonprivate elementary and secondary schools. Tables include data on expenditures for FY 1959-1975, as well as those for specific subject areas for FY 1975.

HRP-0026649/4 Not Available NTIS
Proposed Model for Critical Ethical Analysis.
Leah L. Curtin. 1978, 6p
Pub. in Nursing Forum v17 n1 p12-17 1978.

In teaching ethics, critical analysis of the specific ethical situation can only enhance the quality of decisionmaking. A decisionmaking model can be a useful tool in such analysis by helping to identify the various factors that impinge upon the decision, and by identifying and clarifying certain principles and values. It is noted that a method or a model for ethical decisionmaking should incorporate the fol-

lowing factors: background information, identification of ethical components, ethical agents, identification of options, application of principles, and resolution of ethical ideas. After examining the relevant data, rights, duties, consequences and ethical principles involved in a specific situation, the individual should be able to determine the proper course of action. It is pointed out that one of the major duties of nurses and physicians should be to refrain from making decisions for patients and to do all they can to facilitate decisionmaking on the part of the patients and their families. Since there will always be patients who are unable to make decisions and who do not have advocates or surrogates, courses in ethics which emphasize the importance of developing skills in critical ethical analysis, should be a priority for those in the health professions. Figures are included.

HRP-0026715/3 Not Available NTIS
Maryland Univ. at Baltimore. School of Nursing.
Impact of a Management-Oriented Course on Knowledge and Leadership Skills Exhibited by Baccalaureate Nursing Students.
Anna Marie Brock. 1978, 5p
Pub. in Nursing Research v27 n4 p217-221 Jul-Aug 78.

A study was undertaken to evaluate the impact of a 1-month management concept course on 80 senior baccalaureate nursing students. It was found that leadership values held by nursing students did not affect their leadership behaviors. Those nursing students who were enrolled in the course were found to demonstrate significantly more leadership behaviors and knowledge of leadership concepts than students who did not take the course. The strategies selected for the course were lecture-discussion classes, small group activities, and clinical evaluation experiences. Evidence indicates that lecture and discussion-type classes yield different results. Lectures are superior for the transmission of information, while discussion classes provoke more active thinking. Group discussion allows the learner to gain experience in integrating facts, formulating hypotheses, and amassing relevant information with others. Independent study and simulated learning experiences are also helpful with the process-centered curriculum because they require the student to apply and analyze facts in life situations. The solution to closing the gap between classroom management training efforts and successful performance is thus through the development of content and teaching strategies that enable students to utilize concepts as well as state them.

HRP-0027194/0 Not Available NTIS
Wichita State Univ., KS. Coll. of Health Related Professions.
Model for the Evaluation of Allied Health Education.
Stephen C. Gladhart, and Mark G. Christensen. 1978, 7p
Pub. in Jnl. of Allied Health v7 n3 p199-205 Summer 1978.

A systems model for allied health education evaluation broadens the scope and impact of evaluation and provides a means for continuous information gathering. Input, process, product, and environment components are proposed as a method to study all aspects of program operations. Input evaluation encompasses analysis of human and material resources and procedural designs. Data for process evaluation may be gathered by site visit, interview, testing, and critical examination of ongoing activities. Such evaluation is critical to students' education. Product evaluation helps decisionmakers decide whether to continue, terminate, or modify educational programs. An analysis of external environmental influences may be necessary for assessing the relevance of process criteria and the reasons for the success or failure of program products. After a program has been implemented, data should be collected and analyzed to facilitate improvements. This systems approach allows its users to break away from the traditionally limiting views of evaluation as strictly the measurement of a student's or teacher's performance. Program staff must become aware of the many internal and external forces that affect the training of students.

HRP-0027515/6 Not Available NTIS
American Heart Association, Inc., New York.
Venereal Disease (VD) Education for the 'At Risk' Population.
Mary Genne' Phillips. 1978, 3p
Pub. in Urban Health v7 n6 p32-34 Jul-Aug 78.

The importance of education about venereal disease (VD) for students and other young people of secondary school and college age is discussed. High VD incidence continues even after education attempts because the seriousness of the diseases has been overzealously deemphasized, because students have not been adequately informed about disease consequences in the long term (e.g., ectopic pregnancies) or symptoms (e.g., lack of gonorrhea symptoms in males), and because VD is usually included in the school curriculum with such diseases as tuberculosis. Students' interest can be kindled by involving them in investigative aspects of the epidemiological process. Examples illustrate problems pertaining to location of the sexual contacts of young people, ignorance about the functions and limitations of specific disease tests, complications arising from patients' embarrassment and lack of candor, special disease problems of homosexual and bisexual individuals, and the incurability of herpes simplex II. It is stressed that self-prescription with borrowed antibiotics can render VD asymptomatic without curing it. A meaningful preventive education program requires that students learn the rationale behind disease management efforts and gain understanding of their own values and their responsibilities towards others.

HRP-0027592/5 Not Available NTIS
Yale Univ., New Haven, CT.
Role and Impact of Health Services Research in Health Administration Teaching Programs.
Thomas M. Dunaye, and Stephen M. Shortell. 1978, 6p
Pub. in Program Notes n81 Sep 78. Available from Association of Univ. Programs in Health Administration, Suite 420, One Dupont Circle, Washington, DC 20036.

The relationship between health services research and education programs in health administration was examined at the 1978 annual meeting of the Association of University Programs in Health Administration. A summary of the findings is reported. Six panelists and two reactors addressed a number of issues, including: how and to what degree health administration students should be involved in research; what the objectives of such involvement are for students at various levels; what the relationship is between health administration teaching and applied research; how health services research contributes to faculty development; how a productive program in research is initiated and maintained; and what the advantages are for teaching programs in health administration to design and follow a written plan for research development. Each panelist reviewed the nature of the relationship between health services research and education programs in health administration in his own academic setting. The session was concluded by the reactors reviewing what was said, concentrating on similarities and differences, and then making some general guidelines.

HRP-0027892/9 Not Available NTIS
Massachusetts Univ., Amherst. Div. of Nursing.
What Master's Students Want to Know.
Priscilla R. Ulin. 1978, 4p
Pub. in Nursing Outlook v26 n10 p629-632 Oct 78.

Curriculum revision suggestions from 22 former students of a master's program in community health nursing are presented. The program involves four socioculturally-oriented one semester seminars, as well as practicums in an intensive single-family relationship, in clinical observations, and in independent clinical nursing experience. Most of the former students consider the course content of their graduate seminars inadequate and unrelated to practical problems. They advocate better training in advanced physical assessment skills and in techniques of community health planning and management (program development, management theory, financial planning, record evaluation, agency-board-staff relations, health care financing, and interpretation of legislation). Competence, meaning effective interaction with an extensive network of providers and consumers, and accountability, which is the ability to assess a situation through systematic enquiry and to assume responsibility for taking action, require social-scientific knowledge and familiarity with research methods and tools for ongoing assessment. Proposed curriculum changes call for a strong graduate core curriculum (nursing process and theory, research methodology, legal processes, sociobehavioral care problems), and concentration in family health practice or community health administration, with exposure to both.

HRP-0027948/9 Not Available NTIS
Hawaii Univ., Honolulu. School of Nursing.
Group Interview -- A Tool for Nursing Student Selection.
Margaret Loomis Fong. 1978, 6p
Pub. in Jnl. of Nursing Education v17 n7 p35-40 Sep 78.

The use of group interviews for nursing student selection at the University of Hawaii is discussed. The technique uses a revised version of C. H. Smeltzer's interview guide to reduce subjectivity. Because the interview rating has been the most important admission variable, two interviews with different faculty members were originally conducted; however, the number of applicants became too great. The format developed for group interviews involves: an introduction with information on interests and hobbies; a discussion of interest in nursing; group discussion of two controversial issues, one related to health care and one to interpersonal relations; and questions from applicants. Two training sessions, using discussion and role playing, train faculty in interviewing skills; a faculty facilitator answers questions and makes sure students find their groups. A second interview is conducted if the discrepancy in ratings is too great. Faculty members have supported the system, because less interviewing time per applicant is required than previously and because the process is less tedious; applicants prefer the group format, but complain of inadequate time for self-expression. Results for group interviews show that rating ranges are lower; and while interpersonal and communication skill can be assessed very accurately, problem-solving ability, sincerity of purpose, and interests must be tested by other means (e.g., a rated essay). Two figures and one table are included.

HRP-0028323/4 Not Available NTIS
Holy Cross Hospital of Silver Spring, MD.
Reorienting Staff Attitudes Toward the Dying.
Helen Marie. 1978, 4p
Pub. in Hospital Progress v59 n8 p74-76, 92 Aug 78.

Thanatology classes were established at the Holy Cross Hospital in Silver Spring, Md., to provide better care for terminally ill patients and their families. The pastoral department and the home care department of the hospital were responsible for reorienting staff attitudes toward the dying. These departments served as resources to assist nursing personnel in overcoming their fears of emotional involvement with patients and families. In 1975, the position of thanatology coordinator was created. This coordinator assisted nursing, technical, dietary, housekeeping, and other personnel in learning how to respond to the needs of terminally ill patients. A 13-week introductory course on death, dying, and bereavement was devised. Classes are limited to 15 individuals selected from a cross-section of hospital departments. The content of classes includes basic information about emotional stages through which dying patients progress. Particular attention is given to the need for developing skills that are helpful in listening and responding to patients' and families' needs, the establishment of trusting relationships, and sensitization to physical and psychological trauma. A course entitled 'Crisis as Preparation' has also been introduced. Difficulties encountered by the hospital in its thanatology program pertain to finances and the inability to provide a hospice-like setting within the facility.

HRP-0028440/6 Not Available NTIS
Michael J. Owens Technical Coll., Toledo, OH.
Have We Lost Sight of the Associate Degree (AD) Philosophy.
Peggy A. Bensman. 1977, 3p
Pub. in Nursing Outlook v25 n8 p511-513 Aug 77.

Reasons why changes have occurred in associate degree (AD) nursing programs are discussed. The assumptions on which AD education in nursing was initially based, e.g., the belief that there were levels of functions within nursing, that technical nurses would have access to supervision by professional nurses, and that AD programs in 2-year colleges should be an integral part of the colleges, are outlined. Changes have occurred in two directions: (1) toward providing for the immediate needs of nursing service, while losing sight of the primary goal of preparing technical nurses, and (2) toward a concern for upward mobility and thus the development of programs aimed at insuring the transferability of credits. Some of the reasons why AD programs have changed involve: confusion about responsibilities for patients and about service delivery settings; increasing health care costs; lack of organization in the health care system; the costs of orienting staff; the lack of a coordinated AD curriculum; and changing attitudes about individual rights and self-fulfillment. It is concluded that educators in AD programs must clearly state objectives in terms of technical expectations, rather than in terms of professional expectations or the assurance of transferability to baccalaureate programs, and that the roles, functions, and levels of nurses must be carefully specified.

HRP-0028558/5 Not Available NTIS
Washington Univ., Seattle. School of Nursing.
Computer-Assisted Instruction -- Will It Be Used.
Alice M. Kuramoto. 1978, 4p
Pub. in Nursing Leadership v1 n1 p10-13 Jun 78.

The uses and limitations of computer-assisted instruction (CAI) in the educational system are explored. Five appropriate functions of CAI are to: (1) secure and process information about students' performance before and/or during instruction to specify subsequent activities in the learning process; (2) store large amounts of information, available to learners in a rapid manner; (3) provide programed control of several media, such as slides, television, and equipment; (4) give teachers a convenient tool for designing and developing a course of instruction; and (5) provide a dynamic interaction between students and instructional programs not possible with most other techniques. Assistance to learners, teachers, administrators, and educational technologists represents the most visible use of computers in instruction. Computers can aid in the review and practice of basic concepts and skills, but tutorial use of computers is more complex. In nursing education, CAI can be employed in all modes: drills and practice exercises, tutorial mode, dialog, and games and simulations. Patients' decisionmaking situations can be simulated; this is beneficial in that students do not have to worry about harming the actual patient. The limitations of CAI pertain to: cost; the fact that some forms of computer programs are not compatible with other computer systems; the problem of socialization with a machine-oriented learning situation; and skepticism about the role of computers in instruction.

HRP-0028848/0 Not Available NTIS
New York Academy of Medicine, NY.
Education in Geriatric Medicine.
Irving S. Wright. 1978, 7p
Pub. in Bulletin of the New York Academy of Medicine v54 n10 p944-950 Nov 78.

The need to educate physicians and other health care personnel to deal with the problems presented by the aged population is emphasized. Three subjects which have been neglected in the medical school curriculum must be stressed. They are: gerontology, the study of the aging process; geriatrics, the care of the elderly; and thanatology, the study of death and dying. The development of geriatrics in the United States is outlined. There are only two formal medical programs and very few centers in the United States where any sort of training for research in clinical gerontology can be obtained. The British organization of geriatric care is considered. Geriatric units are autonomous. They are headed by physician-consultants and staffed by house officers, social workers, and rehabilitation personnel. Physicians who care for the elderly must not only be well trained in diagnosis and therapy but must also be willing to involve themselves in the psychiatric, social, legal, and religious aspects of their patients' lives. Suggestions are offered to help deal with the problems of the aged population.

HRP-0029586/5 Not Available NTIS
American Coll. of Nurse-Midwives, Washington, DC.
Core Competencies in Nurse-Midwifery -- Expected Outcomes of Nurse-Midwifery Education.
1979, 5p
Pub. in the Jnl. of Nurse-Midwifery v24 n1 p32-36 Jan-Feb 79.

Functions to be performed by graduates from a nurse midwifery educational program are specified. Theoretical preparation in the sciences and clinical preparation, to acquire the judgment and skills needed in managing and caring for essentially normal women and infants, are covered in nurse midwife education. Care provided by nurse midwives, as defined by the American College of Nurse-Midwives, includes antepartum, intrapartum, postpartum, and/or gynecological care. Core competencies in education include fundamental knowledge, skills, and behaviors expected of graduates. Seven basic core competency areas are identified: family-centered approach to client care; constructive use of communication, group dynamics, guidance, and counseling; communication and collaboration with other members of the health care team; client education; continuity of care; use of appropriate community resources; and promotion of the positive aspects of health. Nurse midwives must be concerned with, and aware of: the management process in caring for women and infants, various phases of maternity care, professional aspects associated with the role of nurse midwives as change agents, complications, and collaborative functions with other health care professionals. The nurse midwife management process and phases of maternity care are outlined. Basic knowledge requirements with regard to possible complications are noted.

HRP-0029587/3 Not Available NTIS
Utah Univ., Salt Lake City. School of Nursing.
Initial Prenatal History and Interview -- A Transitional Approach for Learners.
Joyce Cameron. 1979, 5p
Pub. in the Jnl. of Nurse-Midwifery v24 n1 p27-31 Jan-Feb 79.

A systematic process combining theory and laboratory experience that is intended to prepare nurse midwife students for their first clinical experiences is described. The initial prenatal history and interview can be used as an example to illustrate the functioning of nurse midwives. Four areas of competence must be developed in order to perform a successful history and interview: understand the content of information to be derived; be able to implement a procedure for conducting an interview that is logical, systematic, and complete; be sensitive and able to respond to the situational realities of the client, the environment, and themselves; and be able to report and record their findings in a complete and legible manner. A four-step process has been developed and refined at the University of Utah's College of Nursing, with the assistance of nurse midwife students. The history and interview unit is taught over a 2-week period, using four steps: observation of a faculty-conducted initial prenatal history and interview, essential class content, initial prenatal history and interview of a colleague, and initial prenatal history and interview of two expectant mothers. Expectant mothers who participate are selected primarily from a program designed to prepare parents for childbirth and child rearing. Equipment requirements and necessary student-faculty time expenditures to complete the educational experience are discussed. The history and interview evaluation form is included.

HRP-0030040/0 Not Available NTIS
Non-Clinical Problems.
Marilyn W. Edmunds. 1979, 2p
Pub. in the Nurse Practitioner v4 n3 p42-43 May-Jun 79.

Problems arising in the situation where nurses leave traditional practice settings to acquire advanced nurse practitioner education, and then return to the same practice settings, are described. Nurses generally have some difficulty in role transition in such a situation, and this underscores the importance of considering structure in problem assessment. Structure means the adequacy of physical facilities and equipment, fiscal arrangements, and administration and operations of programs and institutions providing care, as well as expectations of participants. Collaborative practice between nurse practitioners and other members of the health team cannot be developed if changes are not made in the mechanisms of patient assignment and responsibility. The attitudes of patients, other staff, and physicians affect the role change from traditional nurse to nurse practitioner. It is important that physicians introduce nurse practitioners to their patients; without such support, nurse practitioners acquire no legitimacy for their role. The use of negotiated position descriptions at the time joint practice is established may help to resolve problems in role transition. A case history of a nurse who experienced problems is cited.

HRP-0030212/5 Not Available NTIS
Veterans Administration Hospital, Providence, RI.
Ethics as a Component of Nursing Education.
Marjorie Jones Stenberg. 1979, 9p
Pub. in Advances in Nursing Science v1 n3 p53-61 1979.

A framework for teaching ethics in nursing curriculums is described, and objectives are delineated. In planning ethics studies, it is often useful to evaluate stages of moral development and to devise curriculums based on students' levels of attainment. Most literature on teaching ethics deals with professional adjustment rather than ethics. One researcher identifies guidelines for group discussions of ethics: what facts are known; what are the ethical problems (conflicts); what decisions are necessary before action can be taken; whether there are alternative courses of action; and what statements in the International Code for Nurses are relevant. Teaching ethics in nursing education should be based on the assumption that exposure to ethics can establish a habit of thought or a technique of handling patients' problems that considers individual patients' rights and needs. A blending of humanistic and medical expertise has been proposed for educators, enabling students to understand their own values, be familiar with classical philosophical theories of ethics, demonstrate the ability to identify ethical problems in several situations, and develop a personal philosophy of ethics as a framework for nursing interactions. A model for the content of ethics courses in nursing curriculums is described and illustrated.

HRP-0030261/2 Not Available NTIS
Brookwood Medical Center, Inc., Birmingham, AL.
Psychiatric Nursing Consultation -- The Use of an Inservice Model to Assist Nurses in the Grief Process.
Betty S. Baker, and Mary R. Lynn. 1979, 5p
Pub. in the Jnl. of Psychiatric Nursing and Mental Health Services v17 n5 p15-19 May 79.

Nurses at a private hospital attended a 6-hour inservice program to help them control their anxiety, depression, and hostility in dealing with dying patients. The nurses' attitudes toward anxiety, death, and hostility were measured by their scores on the Multiple Affect Adjective Check List (MAACL). Fifteen nurses attended the seminar. Fifteen nurses who did not attend were used as a control group. Both groups of nurses took the MAACL test before the seminar was given and after it was completed. It was found that anxiety and depression were significantly lowered in persons who participated in three of the five inservice sessions. There were no changes in the mean scores of the control group on any scale. It is concluded that the psychiatric nurse consultant can serve as facilitator of the group process, enabling nurses to function independently of the consultant once the consulting process is complete. Four tables are included that show the goals and objectives of the inservice program, a topic outline of the seminar with the methods of instruction used, and the scores on the MAACL test.

PB80-120488 PC A06/MF A01
Cincinnati Univ., OH. Southwestern Ohio Regional Computer Center.
FRDS Final Report.
Final rept.
1979, 106p

Contract EPA-GS-05S-10458

The purpose of the report is to examine the Federal Reporting Data System training project to determine its effectiveness in developing and delivering a week-long training program using content-knowledgeable trainers from three separate organizations located some distance from one another. The FRDS computer system was designed to accept data which the National Safe Drinking Water Act (NSDWA) required States (and Regions acting as surrogate States) to submit to the Federal Government.

PB80-120538 PC **A05**/MF **A01**
Cincinnati Univ., OH. Southwestern Ohio Regional Computer Center.
MSIS Training. Final Report B.
1979, 77p
Contract EPA-GS-05S-10458

The purpose of this report is to describe the process and effectiveness of the training program developed by the Southwestern Ohio Regional Computer Center for the Office of Drinking Water, Environmental Protection Agency, to aid State and Regional personnel in the installation and use of the Model State Information System. This training program was developed using theoretical information concerning adult learning, and consisted of a five-day, team-taught, on-site presentation in twenty-six States and Regions.

PB80-121189 PC **A04**/MF **A01**
Georgetown Univ., Washington, DC. Graduate School.
Staffing State Legislatures: Lessons from the Model Committee Staff Project.
Summary rept.,
Gary J. Clarke. Sep 78, 53p NSF/RA-780222

The report summarizes the findings of an evaluation of the Model Committee Staff Project (MCSP) in Health, established to demonstrate to state legislatures the value of full-time professional staffing for, and year-round operation of, standing committees, and to assist state legislatures in formulating sound public policies in the field of health. To fulfill these goals, two professional staff persons were placed with the health committees of eight state legislatures: Connecticut, Louisiana, Michigan, Minnesota, New Jersey, Texas, Washington, and Wyoming. The MCSP has concluded that better legislative staffing (i.e., additional full-time professional committee staff) has resulted in increased legislative attention to the health area; new information for legislators; beneficial changes in the public policy process; and increased staff influence. It was found that better legislative staffing does not necessarily result in better legislation and that there are decreasing returns to additional investments in staff. The appendices include a chart of major legislative accomplishments (1974-77) and a list of publications resulting from the study.

PB80-122161 PC **A04**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Comparability of Marital Status, Race, Nativity, and Country of Origin on the Death Certificate and Matching Census Record, United States, May-August 1960.
Thea Zelman Hambright. May 69, 54p PHS-PUB-1000-2-34
Library of Congress catalog card no. 75-600268. Pub. as Vital and Health Statistics Ser-2-34.

The report compares the statements of marital status, race, nativity, and country of origin on the death certificate with those on the matching census records. Differences in statements are discussed in terms of their effect on death rates, which are based on death certificate and census information.

PB80-122567 PC **A09**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
STIP (Skill Training Improvement Program) I:CETA and the Private Sector. Implementation Experiences of Selected Projects. Appendix: STIP I Case Studies.
Sep 79, 188p MEL-79-19B
Contract DL-23-25-78-09
Appendix to Final rept. for Apr-Aug 78, PB80-115793.

The volume provides case study information on 15 local Skill Training Improvement Programs (STIP) conducted by Comprehensive Employment and Training Act (CETA) prime sponsors. It is the Appendix to the report PB80-115793: STIP I - CETA and the Private Sector - Implementation Experiences of Selected Projects. Each case study provides a 12-15 page description of how the local program was structured and managed, how occupations were selected, problems and procedures in recruitment and selection of participants, the nature of the training design, the role of the private sector employers, and the relationship of the project to other CETA programs.

PB80-125552 PC **A06**/MF **A01**
Gladstone Associates, Washington, DC.
Surplus School Properties: An Evaluation of Opportunities and Strategies, Orleans Parish, Louisiana.
Dec 79, 123p EDA-79-0186
Prepared in cooperation with Hayden Billes, New Orleans, LA.

Shifting population and enrollment patterns, new budgetary realities and changing fiscal requirements, have caused many school systems to closely examine their school facility operations. The New Orleans Public School System, has had 21 school properties declared 'surplus' -- no longer needed to serve their intended purpose. These schools are presently closed or are underutilized. In devising a strategy for these existing surplus sites, the Orleans Parish School Board applied to, and received, a grant award to enable a study to be undertaken to examine the surplus properties. Three basic realities constitute the rational for the study.

PB80-125594 PC **A03**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
Job Analysis for Selection; An Overview.
Final rept.,
Paul van Rijn. Aug 79, 28p PROFESSIONAL SER-79/2

The report was prepared as a discussion summary for use in training programs on job analysis. It focuses primarily on the use of job analysis in the development of personnel selection procedures and instruments. General characteristics of job analysis and data gathering techniques are described, followed by a discussion of the job analysis requirements of the Uniform Guidelines on Employee Selection Procedures (1978). The report concludes with summary descriptions of some of the major methods of job analysis.

PB80-126741 PC **A07**/MF **A01**
Cooper-Williams Associates, Sumner, MD.
Evaluation of the Annual Manpower Survey of NIH Research Grants. Summary. Part I: Background. Part II: Recommendations. Appendices.
Final rept.,
Pearl C. Williams. Jun 79, 149p DRG-74-1
Contract PHS-263-77-0625
See also Rept. no. 1, PB80-126758.

The purpose of this study was to recommend changes in the NIH annual survey of personnel employed on NIH research grants. Pertinent data were analyzed and interviews held with users of the survey data, data processors, and 190 persons supplying the data at 18 grantee institutions. Part 1 of the 132-page report supplies information on study methodology, development of the NIH survey, need for the data, uses made of the information, objections to the survey, NIH procedures, grantee institution procedures in supplying the information, accuracy of the data supplied, and an analysis of response rates. Part II presents 14 recommendations. The extensive appendix provides documentation for the findings.

PB80-126758 PC **A05**/MF **A01**
National Institutes of Health, Bethesda, MD. Div. of Research Grants.
Manpower: Paid Employment on NIH Research Grants by Awarding Institute, Fiscal Year 1976, Supplement.
Rept. no. 1.
Jun 79, 80p DRG-74-1-1
See also PB80-126741, and Rept. no. 2, PB80-126766.

The report presents summary employment and salary statistics for positions employed on NIH research grants awarded in FY 1976. The data are organized throughout by institute. This report is a supplement to Manpower Report I, published in October 1977, which contained the same data for Fiscal Years 1973, 1974, and 1975. In addition, Tables A through I describe major employment trends for the years FY 1973 - FY 1976. Key variables include occupational category, academic level, field/discipline/specialty, and sex of professional personnel, all furnished by individual institute. Data for total positions and for full time equivalent positions (manyears) are included. A detailed subject index is provided in the appendix to facilitate locating specific data items.

PB80-126766 PC **A06**/MF **A01**
National Institutes of Health, Bethesda, MD. Div. of Research Grants.
Manpower: Training Supported by NIH Research Grants, Training Grants, and Fellowships, Fiscal Year 1976, Supplement.
May 79, 153p DRG-74-1-2
See also Rept. no. 1, PB80-126758, and report dated Feb 78, PB80-126774.

The report presents summary employment and salary statistics for positions employed on NIH research grants awarded in FY 1976. Emphasis is on positions reported as being in a training status; these are presented throughout by academic level and are compared to training grants and fellowships. This report is a supplement to Manpower Report 2, published in February 1978, which contained the same data for fiscal years 1973, 1974, and 1975. In addition, Tables A through H describe employment trends for the four years, 1973 - 1976. Key variables include type of institution, field/discipline/specialty of project employment, degree held or sought, age group, and sex.

PB80-126774 PC **A09**/MF **A01**
National Institutes of Health, Bethesda, MD. Div. of Research Grants.
Manpower: Training Supported by NIH Research Grants, Training Grants, and Fellowships, Fiscal Years 1973, 1974, and 1975.
Feb 78, 196p DRG-74-1-3
See also Rept. no. 2 Supplement, PB80-126766, and Rept. no. 3, PB80-126782.

The report is the second of a series presenting summary employment and salary statistics for positions employed on NIH research grants awarded in fiscal years 1973, 1974, and 1975. Emphasis is on positions reported as being a training status. These are presented throughout by academic level.

PB80-126782 PC **A06**/MF **A01**
National Institutes of Health, Bethesda, MD. Div. of Research Grants.
National Institutes of Health (NIH) Extramural Research Personnel Statistics. Doctorate Level Employment on NIH Research Grants, Fiscal Years 1973-1976.
Rept. no. 3.
Aug 79, 119p DRG-74-1-4
See also report dated Feb 78, PB80-126744, and Rept. no. 4, PB80-126790.

The report, the third in a series, presents summary statistics for positions paid from NIH research grants awarded in fiscal years 1973 through 1976. The data are presented throughout by highest degree held with special emphasis on doctoral level personnel. Included are tables by activity, type of institution, IRG problem/discipline, field/discipline/specialty of project employment, age and sex of incumbents. A detailed subject index is provided. Section I presents data for the total of all professional positions. This includes faculty, non-faculty (professional), and positions reported as in training status. Tables focus on the distribution of positions between professional and academic doctorates, as well as the relationship of positions and salaries paid from the direct costs to grant award data. Sections II, III and IV present selected tables by specific occupational category.

PB80-126790 PC **A05**/MF **A01**
National Institutes of Health, Bethesda, MD. Div. of Research Grants.
Employment of Women in Professional Positions on NIH Research Grants. NIH Extramural Research Personnel Statistics, Fiscal Years 1973-1976.
Rept. no. 4.
Sep 79, 80p DRG-74-1-5
See also Rept. no. 3, PB80-126782.

The report, the fourth of this series, focuses on the extent of utilization of women on NIH research grants. Summary employment and salary statistics are presented for positions paid from grants awarded in fiscal years 1975 through 1976. Comparisons between men and women are included for key variables such as occupational category, highest degree held, field/discipline/specialty of project, employment and age. A detailed subject index is provided in the appendix.

PB80-126824 PC **A06**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
A Linguistic Job Analysis of Federal Clerical Jobs in Puerto Rico.
Final rept.,
Robert C. Sapinkopf. Aug 79, 170p TM-79/6

The purpose of the study is to provide technical information on the linguistic composition of Federal clerical jobs in the Commonwealth of Puerto Rico. A clerical task inventory was administered to 311 Federal clerical incumbents in Puerto Rico and task ratings were obtained on relative time spent and language required.

PB80-127483 PC **A99**/MF **A01**
Workers' Disability Income Systems, Inc., Olympia Fields, IL.
Permanent Disability Benefits in the Workers' Compensation Program.
Final rept.
Oct 79, 879p NSF/RA-790251
Grant NSF-APR75-01067

The adequacy and equity of the benefits and the efficiency of the procedures and standards used to provide compensation for permanent disabilities are addressed. A general introduction to permanent partial disability and workers' compensation include a conceptual framework for the sources of disability among the working age population. The Ten-State Study presents the results of field work and includes an analysis of both standards and procedures to compensate permanent disabilities in ten jurisdictions. The Wage-Loss Study provides data on the earnings losses experienced and the workers' compensation benefits received by samples of injured workers from three states. Conceptual material and data are used to evaluate the permanent disability benefits in the workers' compensation program. Finally, possible reform for permanent disability benefits in workers' compensation is discussed. Included are more than 100 tables and charts and an appendix comprising lists of advisory committees.

PB80-130206 PC **A03**/MF **A01**
Department of Labor, Washington, DC. Library.
Women in Management; Selected Recent References.
Bibliographic rept. 1975-Feb 78,
Jo-Anne Yarborough. Feb 78, 38p USDL-LIB-79-02

The bibliography contains a selection of recent references to books and magazine articles on women in management. Most of the references are annotated. Subject divisions of the bibliography are: General; Women Managers - Development, Training, and Recruitment; Women in Business, including Women in Banking and Women on Boards of Directors; Women in Education.

PB80-804388 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Collective Bargaining and Labor Contracts (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
Jack E. Jones. Feb 80, 201p
Supersedes NTIS/PS-79/0059, NTIS/PS-78/0099 and NTIS/PS-77/0133.

Collective bargaining, with or without the backing of formal union, labor contracts, and Government employee agreements and bargaining are topics covered. Reports on wages are included, only when wage change is a result of bargaining or contract negotiation. (This updated bibliography contains 194 abstracts, 42 of which are new entries to the previous edition.)

PB80-804610 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Career Development. Part 1. Military Careers. Volume 2. 1976-1978 (Citations from the NTIS Data Base).
Rept. for 1976-78,
Carolyn A. Shonyo. Feb 80, 258p
See also Volume 1, 1964-1975, NTIS/PS-77/0134.

The bibliography cites references on career ladders and career motivation in the military area. Studies on enlistment, reenlistment, management techniques, and attrition as related to career development are included. (This updated bibliography contains 251 abstracts, none of which are new entries to the previous edition.)

PB80-804628 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Career Development. Part 1. Military Careers. Volume 3. 1979-January, 1980 (Citations from the NTIS Data Base).
Rept. for 1979-Jan 80,
Mary E. Young. Feb 80, 91p
Supersedes NTIS/PS-79/0077, NTIS/PS-78/0104, and NTIS/PS-77/0135. See also Volume 1, 1964-1975, NTIS/PS-77/0134 and Volume 2, 1976-1978, PB80-804610.

The bibliography cites references on career ladders and career motivation in the military area. Studies on enlistment, reenlistment, management techniques, and attrition as related to career development are included. (This updated bibliography contains 84 abstracts, 79 of which are new entries to the previous edition.)

PB80-804636 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Career Development. Part 2. Civilian Careers. Volume 2. 1976-January, 1980 (Citations from the NTIS Data Base).
Rept. for 1976-Jan 80,
Mary E. Young. Feb 80, 274p
Supersedes NTIS/PS-79/0078, NTIS/PS-78/0105, and NTIS/PS-77/0137. See also Volume 1, 1964-1975, NTIS/PS-77/0136.

The bibliography cites references on studies in career training and education for specific careers in the civilian sector. Reports on career guidance are included. (This updated bibliography contains 267 abstracts, 59 of which are new entries to the previous edition.)

5J. Psychology (Individual and Group Behavior)

AD-A078 481/9 PC **A14**/MF **A01**
North Carolina Univ At Chapel Hill Psychometric Lab
Cognitive Processes in Choice and Decision Behavior.
Final rept. 1 Jan 78-31 Aug 79,
Thomas S. Wallsten, Hillel J. Einhorn, Ebbe B. Ebbesen, Vladimir J. Konecni, and Ruth B. Corbin. 30 Oct 79, 304p Rept no. RM-48
Contract N00014-78-C-0170

Recent years have been important changes in research in behavioral decision theory in terms of a shift from a reliance on economic and statistical models to an emphasis on concepts drawn from cognitive psychology. This report constitutes the proceedings of a conference held June 22-24, 1978, for the purpose of exploring the reasons why the changes have come about and discussing the future directions to which they point. The report contains a preface, 14 original chapters, and a reprint, each authored by various people as indicated separately for each contribution, three broad themes are woven throughout the various discussions of how cognitive limitations and processes affect choice and decision behavior. Some chapters focus on fruitful ways to enlarge the range of decision paradigms studied, others provide examples of richer psychological theories for understanding decision behavior, and a few chapters explore mathematical models in a manner to reflect cognitive rather than economic considerations.

AD-A078 523/8 PC **A04**/MF **A01**
California Univ Los Angeles Dept of Psychology
ARPA Biocybernetics Project. Concluding Report,
Jackson Beatty. 1978, 54p
Contract N00014-70-C-0030

The objective in the DARPA Biocybernetics Program was to investigate the use of pupillary responses in assessing attentional demands on operators of complex man-machine systems. The results of this project were strongly positive: the task-evoked pupillary response has emerged as an excellent physiological indicator of mental workload.

AD-A078 648/3 PC **A04**/MF **A01**
Flying Personnel Research Committee London (England)
Research Abstracts in the Behavioural Sciences, 1971-1975.
Oct 79, 54p FPRC/MEMO 259, DRIC-BR-70099

The abstracts of research papers contained herein are intended to present a general picture, to psychologists and those working in aviation, of the scope of work in the fields of psychology and psychophysiology carried out by RAF research workers over the five years 1971/1975. These abstracts necessarily omit the considerable number of papers that, for security or other reasons, cannot be made available at this stage. The abstracts have been collated under main topic headings as indicated in the list of Contents.

AD-A078 716/8 PC **A05**/MF **A01**
Ohio State Univ Columbus Dept of Psychology
Cognitive Organization of Person Impressions.
Technical rept.,
Thomas M. Ostrom, John H. Lingle, John B. Pryor, and Nehemia Geva. Aug 79, 85p Rept no. TR-1
Contract N00014-79-C-0027

This paper reports two series of studies. The first series examines the effect of making first impression judgments on memory for information about the person. It was found that even up to one week later, people have a better memory for facts relevant to the judgment than for irrelevant facts. The second series of studies deals with how memory is searched when making a decision or judgment about another person. It was found that people do not systematically review previously obtained facts about the person. Rather, they recall previous judgments they made about the person, even if those judgments are irrelevant to the present decision, and use that as the basis for the required decision. (Author)

AD-A078 717/6 PC **A05**/MF **A01**
Ohio State Univ Columbus Dept of Psychology
The Organization of Social Information.
Technical rept.,
Thomas M. Ostrom, John B. Pryor, and David D. Simpson. Dec 79, 78p Rept no. TR-2
Contract N00014-79-C-0027

This paper is concerned with the manner in which people cognitively organize person information when they encounter several facts about each of several persons. The traditional assumption made in social psychology that information is always organized according to persons is challenged and refuted. A series of experiments is reported that uses clustering in free recall as the measure of cognitive organization. It was found that prior familiarity with the stimulus persons strongly affected the extent to which social information was organized by persons. (Author)

AD-A078 859/6 PC A12/MF A01
Deputy Chief of Staff for Personnel (Army) Washington DC
The Reaffirmation of the Unique Special TRUST. TRUST Review Group Report.
Final rept.,
Jack W. Sallee, Keith Sovine, Thomas E. Faley, Jr., Gloria D. Redman, and Lawrence Bredo, Jr.
21 Aug 78, 268p

The purpose of this study was to conduct a review of Army regulations and eliminate, where appropriate, those policies which undermine the special trust and confidence reposed in officers. The review was directed by Chief of Staff Memorandum (CSM) 77-5-21. The CSM directed that the TRUST Review Group recommend for approval of the Chief of Staff of the Army the deletion of those policies that undermine an officer's special trust and that do not accomplish other overriding desirable effects. To conduct the policy analysis, a research design was formulated. The research design addresses the scope of the study, sources of data and data analysis techniques. The review encompassed 1444 Army regulations and, as an adjunct, provided command comments which transcended policy issues. To enhance objectivity, the analysis integrated the perspectives of the HQDA staff, commanders, service schools, individual officers and pertinent research papers. (Author)

ED-169 904 Not available NTIS
Alaska Univ., Fairbanks. Center for Northern Educational Research.
The Social and Behavioral Effects of Broadcast Television on Previously Untouched Audiences.
Final rept.,
James M. Orvik. Aug 78, 133p
Grant NSF-APR76-20988
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Data Bank, Alaska Television Study, Center for Northern Educational Research, University of Alaska, Fairbanks, AL. 99701 (For copies of coded raw data).

This study, conducted prior to the installation of daily prime-time television programming in areas of rural Alaska previously without commercial television service, was designed to provide a foundation of pre-television baseline data against which to measure the social and behavioral effects of television on this multicultural population. Background for understanding the nature of the study is provided by a brief discussion of the distribution of racial groups in rural Alaska and an outline of the distribution of access to commercial and public television. The conceptual model for the research was designed to anticipate the most likely areas that might be changed through the influence of television and consisted of three components--(1) active influences of programming content on the individual viewer, (2) replacive influences of the act of television viewing on the social characteristics of the community, and (3) holistic influences by which active and replacive influences combine to restructure the viewer's relationship with the social and physical environment. Data gathered through observation and a battery of tests were entered into the files in the format of the Statistical Package for the Social Sciences (SPSS). Findings are discussed, and a detailed TV Study Codebook for these data is appended. A bibliography is included.

HRP-0029072/6 Not Available NTIS
Rutgers - The State Univ., New Brunswick, NJ.
Problems in Interprofessional Relations.
Shirley A. Smoyak. 1977, 9p
Presented at the 1976 Annual Health Conference of the New York Academy of Medicine, held Apr 22-23, 1976.
Pub. in Bulletin of the New York Academy of Medicine v53 n1 p51-59 Jan-Feb 77.

Physicians and nurses too often compete with each other. In 1971, the National Joint Practice Commission (NJPC) was formed by the American Medical Association and the American Nurses Association to outline how physicians and nurses could improve their professional relationships. The NJPC identified five areas of contention: (1) most nurses are employed in hospitals and usually feel constricted by organizational bureaucracies; (2) the two professions do not communicate well with each other; (3) excessive demands are placed on both by increased patient loads and decreased budgets; (4) some unjustified inequalities in compensation exist between the two; and (5) male dominance and chauvinism continue. The NJPC advocated that physicians and nurses strive to collaborate as colleagues in joint practices, sharing responsibilities in providing patient care, and that they combine their separate talents to work toward a common goal. A self-administered questionnaire is included to assess receptivity to allowing nurses to perform seemingly simple tasks that are normally reserved for physicians though within the ability and competence of nurses.

PB80-122153 PC A02/MF A01
National Center for Health Statistics, Hyattsville, MD.
Comparison of Timed and Untimed Presentation of the Goodenough-Harris Test of Intellectual Maturity,
Dale B. Harris. Jun 69, 25p PHS-PUB-1000-SER-2-35
Library of Congress catalog card no. 79-600269.
Pub. as Vital and Health Statistics Ser-2-35.

Within this report the effects of modifications of the standard instructions for the administration of the Goodenough-Harris Drawing Test to adolescents are explored. It shows what effect an imposed limitation on the time given to complete a human figure drawing would have on the total Goodenough-Harris score. Such a time limit was found to be necessary in order to use this test as a measure of intellectual maturity in a national survey of adolescents.

PB80-126984 PC A03/MF A01
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
Pilot Study No. 1 for the Collection of Race, Sex and Ethnic Origin Data in Federal Testing.
Final rept.,
Lois C. Northrop. Aug 79, 40p TM-79/15

Six questionnaires, differing only in the wording of an introductory information paragraph, were developed for the collection of race, sex and ethnic origin data on applicants taking Federal employment tests. In addition, visual identifications of the sex and race (Black, White, Other) of applicants were made and recorded by two test development staff members in each exam room. Sex, race and ethnic data were collected on 2250 applicants taking the PACE in May 1977 at the Washington Area Office.

PB80-128275 PC A03/MF A01
National Center for Health Statistics, Hyattsville, MD.
The Development of the Brief Test of Literacy.
Vital and health statistics series,
Thomas F. Donlon, and W. Miles McPeek. Sep 74, 39p PHS-PUB-1000-SER-2-27
Library of Congress catalog card no. 67-62374.
Pub. as Vital and Health Statistics Ser-2-27.

The report outlines the procedures involved in the development of a test of literacy suitable for use in screening large numbers of persons. The report discusses the problems which were faced from the initiation of the project through the final assembly of the test materials, describing the difficulty of definition, the practical constraints on the administration, and the limitations of test design. It provides valuable information to any prospective user of the test or to those who seek to develop their own instruments in this field.

PB80-128291 PC A04/MF A01
National Center for Health Statistics, Hyattsville, MD.
A Study of the Achievement Test Used in the Health Examination Surveys of Persons Aged 6-17 Years.
K. Warner Schaie. Jun 67, 71p PHS-PUB-1000-SER-2-24
Library of Congress catalog card no. 67-60022.
Pub. as Vital and Health Statistics Ser-2-24.

In this report the suitability of the Wide Range Achievement Test as a valid measure of school achievement for use on a national health survey is discussed.

PB80-129414 PC A05/MF A01
National Center for Health Statistics, Hyattsville, MD.
Language and Adjustment Scales for the Thematic Apprecaption Test for Youths 12-17 Years.
Vital and health statistics series,
Ronald S. Neman, Janice F. Neman, and S. B. Sells. Oct 74, 93p VHS/SER-2/62, DHEW/PUB/HRA-75-1336
Library of Congress catalog card no. 73-20183.

The report concerns the development of objectively scored cognitive and affective scales for the Thematic Apperception Test. The data was obtained from story protocols given in response to the five-card, orally administered and tape-recorded version of the TAT used in the Health Examination Survey of youths 12-17 years old completed in 1970.

PB80-129455 PC A05/MF A01
National Center for Health Statistics, Hyattsville, MD.
Language and Adjustment Scales for the Thematic Apperception Test for Children 6-11 Years.
Vital and health statistics series,
Ronald S. Neman, Thomas S. Brown, and S. B. Sells. Dec 73, 79p VHS/SER-2/58, DHEW/PUB/HRA-74-1332
Library of Congress catalog card no. 73-600035.

This is a report on the development and standardization of objective scoring procedures for five cards of the TAT used in the Health Examination Survey of Children 6-11 years of age.

5K. Sociology

AD-A078 475/1 PC A05/MF A01
Army Research Inst for the Behavioral and Social Sciences Alexandria Va
Manual for the Racial Attitudes and Perceptions Survey (RAPS).
Research product rept.,
Guy L. Siebold. Nov 79, 97p Rept no. ARI-RP-79-18

The manual was developed to enable Army personnel to use the Racial Attitudes and Perceptions Survey (RAPS). The RAPS is a 40 minute, paper and pencil questionnaire that measures the attitudes and perceptions of military personnel on racial matters as they are experienced in daily life. Its primary purpose is to provide objective information to the installation commander to aid him in his general program to promote racial harmony. The manual contains the RAPS, a description of its history and structure, specific directions for administering and scoring it, and guidelines for interpreting the results. The manual lists the personnel (and their capabilities) needed to conduct the survey and provides instructions to them on how to carry out their functions. Sample materials are included. (Author)

AD-A078 601/2 PC A04/MF A01
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Characteristics of Army Deserters in the DoD Special Discharge Review Program.
Final rept.,
D. Bruce Bell. Oct 79, 56p Rept no. ARI-RR-1229

The purposes of the report is to describe the characteristics and experiences of Army deserters participating in the Department of Defense Special Discharge Review Program (SDRP) and to draw inference from the data about desertion during the Vietnam era. Participants were divided into two groups: those who lived in foreign lands while absent without level (AWOL) and those who did not. Those groups, in turn, were compared with other deserters and soldiers of the era. Participants in the SDRP were not typical deserters of the time: 81% of them were exiles, compared to 1% to 5% for the era as a whole. The demographic profile of the exiles in the program was quite different from that of the typical deserters and from soi-

diers, in general, of the era. For example, compared with soldiers the exiles were much more likely to be (a) white, (b) highly educated, and (c) higher in mental ability. That finding was anticipated in view of similar findings in a reanalysis of data from the Ford Clemency Program. Exiles were also less likely to have served in Vietnam. Compared with other deserters, they were much more likely to have left the Army for antiwar reasons and to have planned to desert rather than gone AWOL. In contrast, the nonexiled deserters resembled the 'classic' deserter profile of this and previous conflicts. These findings strongly suggest that the Vietnam era produced more than one type of deserter, which should be kept in mind when describing the era. (Author)

HRP-0028413/3 Not Available NTIS
Wisconsin Univ.-Madison.
Social Exchange -- Predicting Transactional Outcomes in Five-Event, Four-Person Systems.
H. Andrew Michener, Eugene D. Cohen, and Aage B. Sorensen. 1977, 14p
Pub. in American Sociological Review v31 p522-535 Jun 77.

A description is provided of an experimental test of Coleman's theory of social exchange, using five-event, four-person exchange systems. The general issues posed by exchange systems are outlined. It is noted that any market system includes people who conduct transactions with each other. Events, also included in the system, are commodities or services traded by the people. Prior to any transaction, each person controls some part of the tradeable events and also has an interest in some or all of the system events. An example is provided. Questions posed by the example are considered. The experimental procedure is discussed and the findings are noted. Coleman's theory of social exchange, based on the assumptions that people will strive to achieve their self-interest, that events are divisible, and that all persons have full information about people's fixed structure of interest in events and the explicit pattern of initial control over events is described. Relevant predictions are derived and goodness-of-fit is tested to determine how well the predictions of Coleman's theory match the empirical observations. It is concluded that Coleman's theory performs better than simple alternative models under the given parameters. Tables illustrate the test data.

PB80-121197 PC **A04**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Some Major Policy Issues in the Administration of a Federal Weatherization Program.
1978, 53p CSA/LN-2403
Contract CSA-B7B-5547

This is a policy analysis paper that reviews the legislative and administrative history of Federal weatherization of low-income housing units.

PB80-128077 PC **A04**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Divorces and Divorce Rates, United States.
Vital and health statistics series, 1940-76,
Alexander A. Plateris. Mar 78, 67p VHS/SER-21-29, DHEW/PUB/PHS-78-1907
Library of Congress catalog card no. 77-14100.

The report presents an analysis of divorce statistics for the early 1970's, including specific divorce rates by various characteristics, based on population data from the 1970 census, and trend data through 1976.

PB80-135650 MF **A01**
Department of Housing and Urban Development, Washington, DC.
HUD Condominium/Cooperative Study. Volume 2: Appendices A-C.
William Lilley. Jul 75, 590p Rept no. HUD-0000345
Paper copy available from the Sup. of Docs., Stock number 023-000-00304-0.

This volume consists entirely of appendices containing six market studies undertaken as part of the overall HUD study of condominium and cooperative housing in the United States, plus three case studies and an in - depth study of the economic and legal impact of condominium conversions in New York City. The six market areas studied were Boston, Mass.; Columbus, Ohio; Fort Lauderdale and Hollywood, Fla.; Lake Tahoe Basin, Calif. and Nev.; San Jose, Calif.; and the Washington, D.C., area including the Virginia and Maryland suburbs. These studies survey the characteristics of each region's housing market, examine each area's experience with condominium and cooperative housing, and list special problems encountered. The major problems identified are the direct result of people's inability to coexist in a concentrated environment. Recreational leases, management problems, and general rules and regulations frequently surface as sources of tension. Also, poor planning by the developer and misuse of the escrow money have been found in some instances. In areas with stringent regulations such as the Lake Tahoe Basin, these problems have been avoided. All six studies contain maps, statistics, and footnotes. The case studies describe the life cycle of three condominium conversion projects, including the tenant mix before conversion, the factors leading to conversion, and the tenant mix after conversion. The New York City study contains tables with data on the economic and demographic impact of condominium conversion in that city.

PB80-135676 PC **A03**/MF **A01**
Urban Inst., Washington, DC.
Revitalizing North American Neighborhoods: A Comparison of Canadian and U.S. Programs for Neighborhood Preservation and Housing Rehabilitation.
David Carlson. Oct 78, 32p HUD-0000348, HUD/PDR-502
Sponsored in part by Central Mortgage and Housing Corp., Ottawa (Ontario) and Canadian Ministry of State for Urban Affairs, Ottawa (Ontario).

A legacy of the Memorandum of Understanding, a 5 - year agreement between the Canadian Ministry of State for Urban Affairs and HUD to share and cooperate in research and dissemination of information concerning neighborhood revitalization, this document compares and contrasts existing neighborhood preservation and housing rehabilitation programs in the two countries. It provides an overview of the existing programs which include Canada's Neighborhood Improvement Program (NIP) and Residential Rehabilitation Assistance Program (RRAP) and HUD's Community Development Block Grant (CDBG), Section 312 Rehabilitation Loan, Urban Homesteading, Neighborhood Housing Services, and Title I Home Improvement Loans programs. NIP provides loans and grants for land clearance, relocation, administration, and basic infrastructure improvements to match Canadian provincial funds on a varying basis, and RRAP, applied in NIP areas, furnishes loans to both homeowners and landlords for housing rehabilitation. The Canadian provincial governments act as the middlemen, negotiating with the Federal government for annual contracts and selecting municipalities to participate in revitalization. In contrast, municipalities in the U.S. negotiate directly with urban assistance programs. The CDBG, the largest and most comprehensive of these types of programs in the U.S., makes Federal funds available to local governments without matching grant money. Three important aspects of the programs in the two nations are contrasted: (1) their differing approaches to planning, citizen participation, and uses of funds; (2) housing quality and rent control requirements; and (3) financing mechanisms for housing rehabilitation. Appendices contain RRAP and Section 8 housing quality standards, as well as a bibliography.

PB80-135700 PC **A08**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Survey of Neighborhoods, Site I, Baseline. Housing Assistance Supply Experiment.
Working note,
Nancy Hope, and Patricia Boren. Jun 77, 166p HUD-0000373
Contract HUD-H-1789

This is a codebook for the baseline survey of neighborhoods conducted in Brown County, Wis., between November 1973 and April 1974 for the Housing Assistance Supply Experiment (HASE) as part of its plan for monitoring the effects of a housing allowance program. It reproduces each question on the two instruments used, one for local sources (the NLS) and one for blockface observations) the NSOB). All permissible responses are given along with their appropriate number code. In addition, 'marginals' are included for each question -- a tabulation of all responses recorded in the master file of survey records. Further annotations include interpretations promulgated at various stages of training, field operation, editing, and data processing. The NLS instrument collected data from local organizations and public records concerning land use, facilities, access to services, and air and water pollution. The NSOB instrument was filled out by observers as they visited 108 neighborhoods of Brown County (a map is included). They noted such neighborhood characteristics as abandoned cars, deteriorating buildings, adequate landscaping, cleanliness, and signs of good repair. The NLS marginals cover the 108 records contained in the local sources preliminary master file, one record for each (HASE) neighborhood. Each record contains 594 data elements. The NSOB marginals cover 8,084 records, one for each blockface surveyed. These are identified by a street segment number and a HASE neighborhood code. Each record contains 262 data elements; marginals are included for 44. The special - purpose variables omitted from the codebook are given in one of the two technical appendices.

PB80-135718 MF **A01**
Urban Inst., Washington, DC.
Lower Income Housing Assistance Program (Section 8): Nationwide Evaluation of the Existing Housing Program.
Technical supplement,
Lorene Yap, Peter Greenston, and Robert Sadacca. Nov 78, 232p HUD-0000386, HUD/PDR-360
Paper copy available from the Sup. of Docs., Stock number 023-000-00489-5.

The technical data in this volume supplement the findings of the HUD report on lower income housing assistance under the Section 8 program. That report evaluates the nationwide housing program which assists low income families. The data were collected in late 1976 by HUD contractors from interviews and agency records. Survey data on the Section 8 Existing Housing Program is reported in tables of national estimates. A general description of the sampling procedure, the collection of the common data, and the statistical methodology is provided. Because the data were collected by three contractors, different sampling methods were employed and data discrepancies occurred. Appropriate cautionary notes are included in the relevant tables. Appended materials include the statistical methodology and formulas used to derive the national estimates in the aggregation of data from each Public Housing Agency (PHA) jurisdiction. Tabular data presents information on the demographic and income characteristics of the participants, the search process and problems encountered by households accepted in the program, and the program results after 1 year of operation. These results include the expenditures, subsidies and changes in the housing conditions, the reactions of landlords to the program, and the involvement of the public housing agencies in the management of the leased units. Comparisons are made between the household categories, and between the demographic types, such as elderly households, minority households, and households with very low incomes. Detailed tabulations for 32 different demographic groups are presented. Footnotes are provided.

PB80-135742 PC **A04**/MF **A01**
Touche Ross and Co., Washington, DC.
Operations Review of the South Bend Housing Allowance Office. Implications for On-Going Programs.
31 Mar 77, 65p HUD-0000489
Contract HUD-H-2510

HUD's Experimental Housing Allowance Program (HAP) is a rent subsidy program designed to answer a variety of questions concerning the feasibility of rent subsidies and their effect on tenants and landlords. This report on the HAP Supply Experiment in South Bend, Ind., contains the results of a review on the implications of Housing Allow-

ance Office (HAO) cost data and procedures for ongoing housing programs, specifically the existing housing component of the Section 8 Program. The review objectives were to assess the efficiency of the HAO and determine where cost - savings could be achieved without serious detriment to program effectiveness, determine which administrative costs and procedures are research related, assess the implications of HAO costs and procedures, and make recommendations on how HAO costs could be reduced. To do this, research staff developed a detailed and comprehensive evaluation design which involved reviewing operations of the South Bend HAO, assessment of the implications of HAO review findings for ongoing programs, and preparation of a report on the basic concepts of the Section 8 and Housing Allowance Programs, administrative procedures employed at HAO, key determinants of administrative costs for agencies involved with a rent subsidy program, the effect on costs of different program assumptions and characteristics, and the Section 8 cost reimbursement methodology. Findings reveal that the administrative cost experience of the HAO is useful in understanding the general determinants of administrative costs but should not be used in direct comparisons with the costs of rent subsidy programs; factors beyond the control of the administrative agency may encourage the agency to alter program goals to reduce costs; administrative agencies can be persuaded to improve the efficiency of operations in ways which do not compromise program goals; and the current approach for reimbursing administrative costs in Section 8 has limitations which may inhibit HUD's ability to adjust to differences among agencies. Appendices contain cost analysis methodology and the HUD handbook on definitions of preliminary and ongoing administrative costs.

PB80-135759 PC **A05/MF A01**
Touche Ross and Co., Washington, DC.
Operations Review of the South Bend Housing Allowance Office.
Final rept.
21 Oct 76, 87p HUD-0000490
Contract HUD-H-2510

Findings and recommendations resulting from an operations review of the South Bend, Ind., Housing Allowance Office (HAO), the administrative agent for the allowance payment program of the Supply experiment being conducted in South Bend, Ind., and Green Bay, Wis., are reported. The review consisted of a general investigation of all HAO activities, interviews with members of the HAO staff and management, review and analysis of client - processing procedures, examination of HAO handbooks, observation of housing evaluation and information sessions, and other methods. At the time of review, the HAO had a staff of 80 and a recipient level of 3,541 households. Following are a sample of findings: (1) management's attention has been diverted from the primary responsibility (to generate recipients), a fact demonstrated by the 6 - month backlog of unprocessed applications; (2) the lack of any backlog in the certification and housing evaluation section suggested an imbalance in workload among the sections and transferral of some personnel to the client services section is suggested; (3) a more extensive prescreening process is needed to cut down on interview time, and (3) quality control reporting for client services activities was not responsive to client needs and should be adjusted to focus on the certification process where a 100 percent review of enrollment and recertification forms takes place. Appendices describe differences between the South Bend and Green Bay HAO's and tables and charts are provided.

PB80-135775 PC **A05/MF A01**
Wooster Coll., OH.
Preferences for Neighborhood Racial Composition.
George C. Galster. 26 Sep 78, 88p HUD-0000493
Grant HUD-H-2877RG

The existence, nature, and magnitude of the tendencies of races to voluntarily 'self - segregate' into particular areas of urban housing markets are investigated, specifically in terms of the following questions: Do whites and blacks have an aversion to the opposite race in their neighborhood, all other things being equal. Is a white aversion to racial mixture due to distaste for blacks per se as individuals, or due to fear of incipient 'tipping' and resulting black majorities in the area or to factors commonly associated with mixed areas, such as lower housing quality and status, or greater turnover and density. The bid - rent theory of housing markets is employed to develop a model showing how housing price variations within a group can provide unambiguous evidence of self - segregating tendencies. The model is operationalized in a multiple regression specification wherein the variations in a given racial group's housing prices become a function of the dwellings' attributes and the attributes of the neighborhood, including quality, status, stability, and density, as well as housing submarket location racial composition. The regressions are estimated using two microhousehold data bases from St. Louis, Mo., and Wooster, Ohio. This allows differences in behavior of households in a large city with a rapidly expanding central ghetto to be compared to those in a small town with a stable, small, and widely dispersed black community. Results show that St. Louis blacks have an aversion to both predominantly black and white neighborhoods. St. Louis whites do not demonstrate an aversion to increased black population until it exceeds 26 percent, whereupon white prices fall. White prices continue to fall with further increases in black percentages. Wooster whites show an aversion to living in neighborhoods having even a few percent of blacks. The findings support the hypotheses that blacks prefer racially balanced integrated areas, while whites prefer all - white areas and are especially averse to integrated neighborhoods where a danger of racial transition is likely. References and tabular and graphic data are provided.

PB80-135783 PC **A05/MF A01**
RAND Corp., Santa Monica, CA.
Clients Responses to Housing Requirements: The First Two Years. Housing Assistance Supply Experiment.
Working note,
Bruce W. Lamar, and Ira S. Lowry. Feb 79, 84p HUD-0000499
Contract HUD-H-1789

Experimental housing allowance programs in Brown County, Wis., and St. Joseph County, Ind., offer monthly cash payments to low - income renters and homeowners, provided that their dwellings meet certain standards. This study traces the housing actions enrollees took to qualify for payments during the first 2 years of program operations. The analysis is based on records for 4,213 enrollees in Brown County and 5,782 in St. Joseph County. About half of all preenrollment dwellings in each site failed initial evaluations. The enrollees whose dwellings most often failed were those with large households, those headed by elderly persons or nonwhites, and those living in inexpensive homes. Failure rates for renters and homeowners were similar overall. About 95 percent of the enrollees whose dwellings were initially acceptable stayed in them and began receiving allowance payments. Of those in unacceptable dwellings, about two - thirds repaired, a tenth moved, and over a fifth terminated their enrollment without ever qualifying for payments. In general, the worst dwellings were the least likely to be repaired, with the occupants usually choosing either to move or terminate. Homeowners were more likely to repair than renters and less likely to move. During the 2 years covered by the data, 83 percent of all enrollees in Brown County and 78 percent in St. Joseph County achieved certification of at least one dwelling. Among those who did not achieve certification, whether they were terminated or still enrolled at the closing date for the file, the striking fact is that few tried very hard to do so; only 8 percent of that group engaged in a repair action or a move that might have led to certification. Within the year following first certification and commencement of payments, 27 to 29 percent of the allowance recipients in each site terminated their enrollments and 6 to 10 percent moved. The terminations mostly reflect loss of eligibility whereas the moves reflect the movers' dissatisfaction with their dwellings. About two - thirds of all recipients stayed in their first certified dwellings until annual evaluations were due. Those evaluations indicate that about a fifth of the dwellings in Brown County and a third in St. Joseph County had fallen below program standards during the year following first certification. Future research into program - related housing decisions can benefit from this improved method of detailing client histories and the correction of errors found in the records. The relationships found in the present study between housing decisions and clients' household and housing characteristics lead to several behavioral hypotheses that should be rigorously tested. Tabular and graphic data are provided, and the appendix includes discussions of eligibility tests, housing standards, payment authorization, and modeling certification success.

PB80-135791 PC **A07/MF A01**
Berkeley Planning Associates, CA.
Evaluation of Housing Assistance Plans. Volume I: The Local HAP (Housing Assistance Plan) Process.
Michael B. Teitz, Karen Christensen, Douglas Fielding, Bruce Johnston, and Deborah Kogan.
30 Aug 78, 128p HUD-0000501
Contract HUD-H-2530

This evaluation of the nature of the impact of the Housing Assistance Plan (HAP) process on local community housing strategies is based on 32 case studies, data on HUD funding in 183 cities, and a random sample of 120 HAP's drawn from HUD files. Largest problems came when Federal policy conflicted with local priorities. In suburban communities, especially, local officials wanted to focus exclusively on housing for the elderly while Federal policy wanted to disperse low - income families. In metropolitan areas, funding was often denied if projects were in areas of low - income concentration. These tensions, combined with occasional capricious HUD rulings, led to some distrust. On the positive side, the HAP process focused attention on housing issues. In cities, the preparation of the HAP was usually the job of the planning department. In smaller towns, one person usually took charge. A few small communities relied on guesswork, but many hired a consultant or ran a local survey, gathering much useful data. The HAP itself commanded little political attention and there was a surprising lack of interest on the part of citizens and developers. Only those few areawide planning organizations with strong housing policy powers influenced HAP's through the A - 95 review policy while State housing agencies tended to disregard them. The major problem identified is the disruptive effect of HUD - mandated policies on the local process, an issue which needs to be resolved. The study is well documented and contains technical appendices.

PB80-135809 PC **A06/MF A01**
Berkeley Planning Associates, CA.
Evaluation of Housing Assistance Plans. Volume II: Local Housing Objectives and Strategies.
Michael B. Teitz, Karen Christensen, Douglas Fielding, Bruce Johnston, and Deborah Kogan.
30 Aug 78, 113p HUD-0000502
Contract HUD-H-2530

The Housing Assistance Plan (HAP) was conceived as a tool to help local communities set their own housing policy. This evaluation used case studies from 36 cities, suburbs, and small communities to examine the HAP process and its effect on local housing goals. In general, the HAP process has been surrounded by conflict, particularly when local priorities conflict with Federal and regional housing goals. This has been particularly evident in suburban communities which plan to help the elderly but do not wish to assist low income families. However, because cities are more familiar with Federal guidelines and have a greater commitment to low income families, the process has been quite successful for large metropolitan communities. Section 8 programs were the most frequently used type of aid; many jurisdictions considered HAP synonymous with Section 8. HAP's are not used for such issues as growth control, housing price inflation, and redlining, and do not guarantee creative approaches to housing policy. Implementation of local Community Development Block Grant (CDBG) strategies has generally been successful although organizational and power shifts within local governments and inexperience, necessitating a learning process, have caused some difficulty. It is concluded that although the HAP has not led to great changes in housing strategy, it has en-

couraged communities to consider the housing market as a whole. The study findings are detailed in tables and appendices.

PB80-135817 PC **A15/MF A01**
Berkeley Planning Associates, CA.
Evaluation of Housing Assistance Plans. Volume III. Delivery System Response to Housing Assistance Plans.
Michael B. Teitz, Karen Christensen, Douglas Fielding, Bruce Johnston, and Deborah Kogan.
30 Aug 78, 339p HUD-0000503
Contract HUD-H-2530

This report examines the particular mix of housing assistance received by participating communities under the Housing Assistance Plan (HAP) and the equity of the distribution procedures. Most of the data focuses on Section 8 program delivery to 170 localities in 8 standard metropolitan areas. On the whole, the program is disproportionately skewed toward large cities. Cities with new construction goals smaller than 100 units are less likely to receive any new construction assistance than cities with goals for more than 100 units. There is geographic disparity also. Cities in the Denver, Colo., Minneapolis, Minn., and Charlotte, N.C., regions are more likely to receive assistance than cities in other areas. Rehabilitation projects showed similar discrepancies in funding as did assistance to existing units. Central city areas tended to receive Section 8 assistance that are in one - to - one correspondence with HAP goals. If Loan Management units are excluded, corresponence is halved, revealing significant gaps between goals, resources, and responses. In suburban areas much smaller proportions of goals were met. The program got some suburban communities to think about housing goals for the first time. Case studies show the program did not encourage migration of low - income families to the suburbs. Suburban projects served slightly higher income groups and most recipients were already in the suburban area. The administration of the program is examined in detail. The findings are heavily documented with charts, tables, and statistics.

PB80-135825 PC **A10/MF A01**
Berkeley Planning Associates, CA.
Evaluation of Housing Assistance Plans. Volume IV: The Adequacy of HAP (Housing Assistance Plan) Content and Design.
Michael B. Teitz, Karen Christensen, Douglas Fielding, Bruce Johnston, and Deborah Kogan.
30 Aug 78, 225p HUD-0000504
Contract HUD-H-2530

This evaluation examined all Housing Assistance Plan (HAP) documents filed with HUD to determine the adequacy of the form used and the type of community response it inspired. Most communities genuinely attempted to comply with HAP requirements. Most prepared data describing local conditions, provided documentation, and developed local program goals. However, many communities failed to complete specific data matrices because the data either were not available or were not available in the form requested by the HAP. Failure to provide methodology documentation was widespread, particularly documentation of the data source for each cell and the structure of local surveys used. Except for larger cities, communities presented scant documentation for goal priorities. There were few violations of the 10 percent rule holding beneficiary composition of total goals proportional to total assistance needs but many communities proposed new construction in spite of rental vacancy rates above 6 percent. The HAP document itself is criticized for containing many meaningless cells, for failing to ask about overcrowded units and other significant information, and for confronting the municipality with confusing columns of totals and subtotals. Because it is a static document it fails to elicit data about changing conditions. Because data collection methods are not comparable, it cannot be used to provide aggregate totals. The general instructions and guidelines are also called confusing. Statistical tables, copies of completed HAP's, and other supporting data are included.

PB80-135833 PC **A06/MF A01**
Berkeley Planning Associates, CA.
Evaluation of Housing Assistance Plans. Volume V: Conclusions and Recommendations.
Final rept.,
Michael B. Teitz, Karen Christensen, Douglas Fielding, Bruce Johnston, and Deborah Kogan.
30 Aug 78, 114p HUD-0000505
Contract HUD-H-2530

The previous four volumes of this evaluation found that serious dysfunctions exist in the housing and community development system because HUD's provision of housing assistance does not respond to Housing Assistance Plan (HAP) goals. Local planners often see the HAP as an irrelevant requirement for Community Development Block Grants while citizens and politicians view it as both a technical and trivial document. The simplified matrix format accents the HAP's technical abstraction from the intricacies of local housing issues. To remedy this, the report makes 37 recommendations relating to the form of the HAP, its use in awarding grants, and the administration of the Community Development Block Grant (CDBG) program as a whole. The HAP should be simplified so that it contains only those data items necessary for program decisions. It should be a 3 - year plan to be developed by local communities, a narrative summary should focus on local housing needs, and the emphasis should be placed on identifying groups who will benefit from housing assistance. Greater emphasis needs to be placed on rural housing. HUD administrative practices are criticized, especially delays in making grant decisions and the use of Section 8 funds to bolster failing HUD projects. New formulas for computing grant eligibility, faster review procedures, and a plan for quickly recycling all unawarded money are spelled out.

PB80-135841 PC **A05/MF A01**
RAND Corp., Santa Monica, CA.
Rent Inflation in Brown County, Wisconsin: 1973-78. Housing Assistance Supply Experiment.
Final rept.,
James P. Stucker. Aug 78, 93p HUD-0000506
Contract HUD-H-1789

The experimental housing allowance program operated by the Brown County Housing Allowance Office is designed to enable participants with low incomes to afford decent, safe, and sanitary housing in that community. The schedule of the standard cost of adequate housing (R) that was adopted when enrollment began in June 1974 reflected housing costs in the county as they were reported in a market survey conducted in August, September, and October of 1973. In April 1976, the R schedule was increased by about 16 percent to compensate for rent increases occurring in the 30 months since it was first set. In April 1977, the schedule was increased across the board by about 6 percent to compensate for fuel and utility cost increases. The study reported here was promoted by evidence that inflation in the cost of housing had made even the latest schedule obsolete, and that allowance payments were no longer adequate to serve program purposes. The study is based primarily on surveys of housing costs throughout the county that were not available for the 1976 and 1977 revisions. From the data gathered, it is concluded that between 1974 and 1977, contract rent in the county increased at an average annual rate of about 4.4 percent. Gross rent, including fuel and utility services billed to tenants, increased at an average annual rate of about 6.6 percent. The inflation rate varied markedly in different sectors of the rental market. It was higher for single - family homes than for apartments and higher for low - rent units than for high - rent units. While the rate of increase in fuel and utility costs appears to have moderated, tentative estimates of rent inflation in 1977 indicate that gross rent, implying shelter rent, increased even faster in 1977 than in 1976. Under those circumstances, it is concluded that the best estimate of inflation for April 1977 to April 1978 is provided by a sample extrapolation of the estimate for January 1976 through March 1977. Proposed adjustments in the payment schedule to compensate for the inflation rate are presented, and the effects of the proposed change are discussed. Tabular and graphic data are presented. The appendix includes alternative estimates of inflation rates for 1977, rate schedules for fuel and utility services, 1973 - 1978, and rent change in Brown County as a response to fuel oil cost increases.

PB80-135882 PC **A13/MF A01**
RAND Corp., Santa Monica, CA.
Codebook for the HAO (Housing Allowance Office) Client Characteristics File: Site I, First Year. Housing Assistance Supply Experiment.
Working note,
Marsha A. Dade, and Ann W. Wang. May 76,
297p HUD-0000510
Contract HUD-H-1789

This working note, prepared for HUD, is one of a series that will constitute an archive of Housing Allowance Office (HAO) materials used to analyze the effects of the experimental allowance programs on their clients and their communities. This note is a codebook for the HAO client characteristics file for Site I (Brown County, Wis.), which contains data on all 5,369 households that applied for assistance during the program's first year (June 18, 1974 to June 20, 1975). Most of the data relate to a smaller set, the 3,085 households who actually enrolled in the program during that period. The client characteristics file is compiled from administrative records maintained by the HAO. The codebook describes each data element in the file, identifying the administrative record from which it was taken, reproducing the relevant portion of the administrative form, specifying all permissible entries, and annotating each element with administrative interpretations promulgated by the HAO. The codebook also contains 'marginals' for each data element -- a tabulation of all responses recorded in the client characteristics file. A companion codebook has been prepared for the HAO housing characteristics file for Site I, covering the same period. The introduction to the codebook discusses the organization of the codebook, data cleaning, the HAO forms, and HAO form updates. The appendix includes HAO forms, standard tables of housing expenses, and Site I maps for neighborhoods and census tracts.

PB80-135890 PC **A04/MF A01**
Touche Ross and Co., Washington, DC.
Review of Cost Determinants for Section 8 Existing Housing Program.
Final rept.
31 Oct 77, 51p HUD-0000512
Contract HUD-H-2510

Results are reported of a review of cost determinants of the Section 8 Existing Housing Program. Objectives of the study were to (1) identify the key determinants of administrative costs based on the findings of previous Section 8 reports, (2) categorize these determinants according to which are controllable by HUD or the Public Housing Authority (PHA), (3) identify evaluation criteria and evaluate the current reimbursement methodology, (4) identify alternative reimbursement methodologies, and (5) recommend an approach for determining the most appropriate method for reimbursing Section 8 administrative costs. Findings show that the actual costs of starting a Section 8 program vary widely among agencies. The ongoing costs of maintaining recipients in the program are yet to be fully identified because most of the agencies reviewed had been in the program less than one year. The current reimbursement methodology used by HUD has several shortcomings, but how well it covers actual costs and what incentives it provides PHA have yet to be determined. It is not yet possible, therefore, to select the most appropriate reimbursement methodology until more information is available on cost determinants and actual costs. There are alternative reimbursement approaches that could overcome some of the difficulties of the current methodology, but other issues would still need to be examined. Based on the conclusions, various approaches by which HUD can obtain the necessary information to make beneficial changes to Section 8 are considered. Tasks related to determining administrative costs are recommended.

PB80-135908 PC **A15/MF A01**
Department of Housing and Urban Development, Washington, DC. Office of the Assistant Secretary for Policy Development and Research.
National Housing Goal.
Annual rept. no. 10.
Feb 79, 347p Rept no. HUD-0000513

The state of the housing inventory and the characteristics of housing production in 1977 are described, along with anticipated developments in 1978, a summary of the housing policies of the cur-

rent Administration, and data and other material on some of the broader issues which relate to future housing policy. Six objectives of housing policy are listed and discussed: (1) meeting assisted housing needs through new construction starts and increased occupancy levels; (2) fully using the existing housing stock by reclaiming and restoring deteriorated units; (3) being responsive to the particular needs of individual communities; (4) increasing the housing choices available to low income and minority families; (5) improving the delivery system of housing services to small towns and rural areas; and (6) encouraging middle - income households to remain in or return to the older urban areas. Statistics on housing production and marketing show that, while multifamily and mobile home output was meager, the single family housing production level of 1.451 million units in 1977 was the highest volume on record, with the exception of one or two years in the early 1950s. The outlook for housing production and marketing throughout 1978 is for continued high levels of output, although the total volume is expected to be somewhat lower than in 1977. Housing prices and costs continue to be a matter of concern, and trends in construction and operating costs in relation to general prices in the economy and the incomes of homeowners and renters are discussed. Changes in the quality of the nation's existing housing stock, based on evidence from the decennial census and the Annual Housing Survey are examined. It is concluded there will be no significant supply shortages in 1978. Statisical tables are included, and the appendices discuss Federal aids for housing, preservation of existing housing and neighborhoods, nonfinancial resources for housing production, availability of mortgage funds for housing in 1978, and a comparative review of European experience in determining future housing requirements.

PB80-135973 PC **A06/MF A01**
Department of Housing and Urban Development, San Francisco, CA. Office of Program Planning and Evaluation.
National Subsidized Housing Evaluation. Beneficiaries Study. Volume I: Findings and Conclusions.
Astrid Trauth, David Taylor, Phyllis Jarreau, Joel Posner, and Jayne Hulbert. Jun 73, 118p Rept no. HUD-0000525

To find out if HUD subsidy resources were being deflected to certain groups of eligible persons at the expense of other eligible groups, interviewers surveyed 305 beneficiaries, 294 income - eligible people who were not receiving subsidies, and a sample of project administrators, apartment managers, and HUD staff. There appear to be only a few important differences between actual and intended beneficiaries and these differences cannot be described as systematic patterns of exclusion. In general, households headed by white males are included more than households headed by black males, while those headed by black females were included more than those headed by white females. Larger families made up of only adults tended to be excluded while families with children were included. These patterns, however, did not hold firm across all 20 metropolitan areas in Region IX. Patterns of exclusion in one area were offset by differing patterns in another so that a systemwide pattern of similarities emerges. Although intermediaries hold negative attitudes toward applicants and residents and many discriminate against certain groups in isolated cases, no pattern of exclusion could be discerned. Program participants were more satisfied with their housing and inspection show it to be in better condition than the housing of nonparticipants. This study contains statistics, charts, graphs, and technical appendices.

PB80-135981 PC **A06/MF A01**
Department of Housing and Urban Development, San Francisco, CA. Office of Program Planning and Evaluation.
National Subsidized Housing Evaluation. Beneficiaries Study. Volume 2.
Astrid Trauth, David Taylor, Phyllis Jarreau, Joel Posner, and Jayne Hulbert. Jun 73, 151p Rept no. HUD-0000526

This continuation of appendices for the Beneficiaries study of the National Subsidized Housing Evaluation contains the sampling plan and the interview instruments and procedures. Samples of three different groups were selected: (1) beneficiaries currently living in subsidized housing units, (2) eligible persons who were not beneficiaries, and (3) intermediaries and HUD personnel. The study covered 20 metropolitan areas in Region IX. The first of the four interview instruments is a booklet of simple multiple - choice questions to be filled in by beneficiaries and nonbeneficiaries. The three instruments for intermediaries are more complex. An open - ended questionnaire probes for attitudes about the program and methods that were used to select tenants. A second questionnaire asks essentially the same questions but focuses on the manager's relationship with HUD. A third is worded in such a way as to suggest that recommendations for revamping the program are being sought. This approach is used to elicit information on sensitive topics. All three instruments are included together with tables summarizing statistics collected. The interviewing experience showed that people were eager to participate and interviewers often had respondents volunteering information over the phone when they were merely trying to set up an appointment.

PB80-804537 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Rehabilitation of the Mentally Retarded. Volume 2. 1976-January, 1980 (Citations from the NTIS Data Base).
Rept. for 1976-Jan 80,
Mary E. Young. Feb 80, 49p
Supersedes NTIS/PS-79/0027, NTIS/PS-78/0051 and NTIS/PS-77/0060. See also Volume 1, NTIS/PS-79/0026, 1964-1977.

The bibliography includes programs and evaluations of their success in training the mentally handicapped person for a productive life. Also included are reports on psychotherapy of retarded and brain damaged children and mental casualties of the Armed Forces. (This updated bibliography contains 42 abstracts, 17 of which are new entries to the previous edition.)

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A078 299/5 PC **A02/MF A01**
Naval Medical Research Inst Bethesda MD
Anaphylaxis to Protamine Sulfate Mediated by a Complement-Dependent IgG Antibody.
Final rept.,
James D. Lakin, Thomas J. Blocker, Douglas M. Strong, and Michael W. Yocum. 6 Mar 77, 9p
Rept no. NMRI-78-124
Pub. in The Jnl. of Allergy and Clinical Immunology, v61 n2 p102-107 Feb 78.29.

No abstract available.

AD-A078 316/7 PC **A02/MF A01**
Naval Medical Research Inst Bethesda MD
Inhibition of Acetylcholinesterase by TX-100.
Medical research progress rept.,
D. B. Millar, J. P. Christopher, and W. H. Bishop. 26 Jan 79, 7p Rept no. NMRI-79-62
Pub. in Biophysical Chemistry, v10 p147-151 1979.

No abstract available.

AD-A078 380/3 PC **A02/MF A01**
Army Medical Bioengineering Research and Development Lab Fort Detrick MD
The Reaction of Nucleotides with Aqueous Hypochlorous Acid,
William H. Dennis, Jr., Vincent P. Olivieri, and Cornelius W. Kruse. 21 Sep 78, 8p
Pub. in Water Research, v13 p357-362 1979.

No abstract available.

AD-A078 591/5 PC **A06/MF A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Mathematical Analysis of Artificial Enzymatically Active Membranes.
Technical rept.,
J. P. Kernevez. May 79, 105p LCDS-LN-79-2, ARO-13915.27-M
Contract DAAG29-76-G-0294, Grant NSF-MCS79-05774

The systems described in this report are immobilized enzyme membranes, produced and experimentally studied by D. Thomas and his group. The concentrations in these artificial membranes are governed by the interaction of diffusion and reaction, and they may have behaviors characteristic of dissipative structures: hysteresis (related to the existence of multiple stable steady states), oscillations, wave front propagation and pattern formation. Since analogous phenomena exist in (much more complex.) living systems (short-term memory, biological clocks, transmission of signals, morphogenesis) it is interesting to study, in a well-defined context, the interaction of diffusion and enzyme reaction.

AD-A078 736/6 PC **A02/MF A01**
Army Medical Research Inst of Infectious Diseases Frederick MD
Diurnal Response in Endogenous Amino Acid Oxidation and Degradation of Body Protein of Meal-Fed Rats.
Interim rept.,
Robert W. Wannemacher, Jr., and Richard E. Dinterman. 6 Dec 79, 25p

A model has been developed to measure the effects of dietary protein on daily fluctuations in the rate of endogenous amino acid oxidation and degradation of body protein in meal-fed and starved rats. In addition, N-methylhistidine and hydroxyproline were utilized to estimate changes in the rate of degradation of myofibrillar and collagen proteins. In rats meal-fed a normal diet of 18% casein, a diurnal response was observed in rate of oxidation of radioactive amino acids contained in endogenous labelled body protein, with a nadir 16-20 h and maximum 24 h after beginning the feeding. This observation apparently is related to alterations in rates of protein degradation and flux of amino acids from nonhepatic tissues to site of oxidation in liver.

N80-14689/7 PC **A13/MF A01**
Jet Propulsion Lab., Pasadena, Ca.
Synthesis and Biological Screening by Novel Hybrid Fluorocarbon Hydrocarbon Compounds for Use as Artificial Blood Substitutes.
Second Annual Report, Jul. 1977 - Jul. 1978.
J. Moacanin, K. Scherer, A. Toronto, D. Lawson, and T. Terranova. 15 Oct 79, 276p NASA-CR-162537, JPL-PUB-79-36
Contract NAS7-100
Subm-Sponsored in Part by NIH.

A series of hybrid fluorochemicals of general structure R(1)R(2)R(3)CR(4) was prepared where the R(i)'s (i=1,2,3) is a saturated fluoroalkyl group of formula C sub N F sub 2n+1, and R(4) is an alkyl group C sub n H sub 2n+1 or a related moiety containing amino, ether, or ester functions but no CF bonds. Compounds of this class containing approximately eight to twenty carbons total have physical properties suitable for use as the oxygen carrying phase of fluorochemical emulsion artificial blood. The chemical synthesis, and physical and biological testing of pure single isomers of the proposed artificial blood candidate compounds are included. Significant results are given.

PB80-127699 PC **A06/MF A01**
Iowa State Univ., Ames. Dept. of Chemical Engineering.
The Purification and Characterization of an Endo-Xylanase from Aspergillus Niger.
Master's thesis,
Ricardo Fournier Angel. 1979, 125p NSF/RA-790252
Grant NSF-PFR77-00198

Development of a method for the purification and partial characterization of endoxylanase obtained from the fungus Aspergillus niger is reported. This xylanase hydrolyzes xylan, a component of the hemicellulose complex found in large amounts in cereal. Hence, the enzymatic process has important implications as a potential source of food and energy. The thesis reviews previous work in this field and outlines the objectives and approach for this study. Experimental methods describe purifi-

cation of endoxylanase from A. niger by centrifugation, column chromatography, and ultrafiltration. Results obtained indicate a final enzyme yield of 0.24% and a 4-fold purification. Optimum pH and temperature for activity were 5.1 and 42 C respectively. The molecular weight was 28,000 daltons. Its amino acid composition showed a high proportion of acidic and aromatic amino acids. Calcium ion activates the enzyme and mercuric ion inhibits it. Carbohydrate content of the enzyme was 22%. The enzyme hydrolyzed soluble and insoluble xylan to a mixture of xyloologosaccharisedes.

PB80-930900 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Hormones in Cancer-Related Biology: Steroid Hormones.
Cancergram CB07.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The scope of this Cancergram is comprehensive coverage of steroid biochemistry, metabolism, and effects on tumors. Of primary interest are androgens, estrogens, progestagens, corticosteroids, and their respective metabolites and breakdown products. Synthetic steroids will also be noted when they are used nontherapeutically in cancer-related studies. Complementary to this series is Cancergram series CB24, covering the cancer-related biology of nonsteroid hormones. Studies specifically concerning steroid hormone-related carcinogenesis are generally excluded here, as they are covered by Cancergram series CK05.

6B. Bioengineering

N80-14675/6 PC **A09**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
A Controlled Rate Freeze/Thaw System for Cryopreservation of Biological Materials.
V. J. Anselmo, and R. G. Harrison. 1 Jun 79, 182p NASA-CR-162531, JPL-PUB-79-91
Contract NAS7-100
Subm-Prepared for Union Carbide CO.

A system which allows programmable temperature-time control for a 5 cc sample volume of an arbitrary biological material was constructed. Steady state and dynamic temperature control was obtained by supplying heat to the sample volume through resistive elements constructed as an integral part of the sample container. For cooling purposes, this container was totally immersed into a cold heat sink. Sample volume thermodynamic property data were obtained by measurements of heater power and heat flux through the container walls. Using a mixture of dry ice and alcohol at -79 C, sample volume was controlled from +40 C to -60 C at rates from steady state to + or - 65 C/min. Steady state temperature precision was better than 0.2 C while the dynamic capability depends on the temperature rate of change as well as the thermal mass of the sample and the container.

N80-14676/4 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Langley Station, VA. Langley Research Center.
Investigation of Effects of Temperature, Salinity, and Electrode Design on the Performance of an Electrochemical Coliform Detector.
D. C. Grana. Nov 79, 54p NASA-TM-80130, EPA-600/4-79-075
Contract EPA-IAG-D7-0053

The results of two research programs to determine the optimum detector design for measuring fecal coliforms in saline waters for operational systems are presented. One program was concerned with the effects of temperature and salinity on endpoint response time, and the other, the interaction between electrode configurations and the test organisms. Test results show that the endpoint response time is related to salinity and seawater temperature; however, these results can be minimized by the correct choice of growth media. Electrode configurations were developed from stainless steel, Parlodion-coated stainless steel, and platinum that circumvented problems associated with the commercial redox electrodes.

6C. Biology

AD-A078 301/9 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Differential Endotoxin Sensitivity of Lymphocytes and Macrophages from Mice with an X-Linked Defect in B Cell Maturation.
Medical research progress rept.,
David L. Rosenstreich, Stefanie N. Vogel, Allen Jacques, Larry M. Wahl, and Irwin Scher. 6 Apr 78, 9p Rept no. NMRI-78-136
Pub. in The Jnl. of Immunology, v121 n2 p685-690 Aug 78.

No abstract available.

AD-A078 305/0 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
B Lymphocyte Development and Activation: Analysis with a Mutant Mouse Strain.
Medical research progress rept.,
William E. Paul, Bondada Subbarao, James J. Mond, Donna G. Sieckmann, and Ian Zitron. 1979, 17p Rept no. NMRI-79-58
Pub. in Cells of Immunoglobulin Synthesis, p383-396 1979.

No abstract available.

AD-A078 314/2 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Surface Immunoglobulin Density on Human Peripheral Blood Mononuclear Cells.
Final rept.,
Robert B. Slease, Richard Wistar, Jr., and Irwin Scher. 30 Nov 78, 19p Rept no. NMRI-79-60
Pub. in Blood, v54 n1 p72-87 Jul 79.

No abstract available.

AD-A078 642/6 PC **A04**/MF **A01**
Rosenstiel School of Marine and Atmospheric Science Miami FL
Underwater Sound: A Review of Its Effects on Sharks.
Technical rept. Apr 78-Dec 79,
Arthur A. Myrberg, Jr. Dec 79, 55p Rept no. UM-RSMAS-79004
Contract N00014-76-C-0142

Reprints are provided of three published studies on underwater sound and its effects on the behavior of sharks. Subjects include those species of sharks which have been attracted to sound sources, the physical factors which appear to be important or unimportant for an acoustical attractant, and the behavior of sharks in the vicinity of a sound source. Emphasis is directed also at those qualities of sound that promote withdrawal from a sound source by three species of sharks, Carcharhinus falciformis, C. longimanus and Negaprion brevirostris. (Author)

AD-A078 711/9 PC **A05**/MF **A01**
Naval Arctic Research Lab Barrow AK
Biophysics of Cold Adaptation and Acclimatization.
Annual technical rept. no. 3 (Final) for period ending FY79,
Gary A. Laursen, and George M. Selby. 1979, 80p
Contract N00014-77-C-0162

Contents: Projects and Productivity; Research Accomplishments; CETA Arctic Mammalogy Program; First International Symposium on Arctic Mycology; Animal Care and Maintenance; and Facility Staff Improvements and Administration.

AD-A078 766/3 PC **A02**/MF **A01**
Naval Medical Research Unit No 2 APO San Francisco 96263
Heterologous Mating of Schistosoma Japonicum and Schistosoma Incognitum in Experimentally Infected Rodents.
E. E. Stafford, W. P. Carney, and S. Tanudjaja. 1978, 4p Rept no. NAMRU-2-TR-828
Pub. in Southeast Asian Jnl. of Tropical Medicine and Hygiene, v10 n1 p149-150 Mar 79.

No abstract available.

N80-14672/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Rna Content in Motor and Sensory Neurons and Surrounding Neuroglia of Mouse Spinal Cord under Conditions of Hypodynamia and Following Normalization.
V. A. Brumberg, and L. Z. Pevzner. Dec 79, 9p NASA-TM-75983
Contract NASW-3199
Tran-Transl. into English from Tsitologiya (Ussr), V. 10, No. 11, 1968 p 1452-1459. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Academy of Sci. (Leningrad).

Male white mice were subjected to two and three week hypodynamia and then decapitated. Cytoplasmic RNA content per cell was measured by means of ultraviolet cytospectrometry. Changes in RNA content are shown, and the dynamics of the reparative processes of cells are discussed.

N80-14807/5 PC **A04**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
A Model for the Computational Determination of Parameter Values of Anthropomorphic Segments.
H. Hatze. May 79, 65p CSIR-TWISK-79

A model is presented for determining by computation the parameter values of anthropomorphic segments from a battery of 242 anthropometric measurements taken directly from the subject. The model consists of 17 segments, includes the shoulders as separate entitites, and subdivides segments into small mass elements of different geometrical structures, thus allowing the shape and density fluctuations of a segment to be modelled in detail. The model differentiates between male and female subjects (exomorphic differences, different density functions and mass distributions), adjusts the densities of certain segmental parts according to the value of a special subcutaneous-fat indicator, and fully accounts for the specifities of pregnancy and obesity. The input data errors are drastically reduced by performing direct anthropometric measurements rather than indirect measurements from photo images and the overal accuracy of the model is better than 3% with a maximum error of about 5%.

PB80-126485 PC **A03**/MF **A01**
National Marine Fisheries Service, Seattle, WA.
Marine Fisheries Review. Volume 41, Number 7, Jul 79.
Jul 79, 49p NOAA-79102301
See also Volume 41, Number 5-6, PB80-112519.

In addition to its regular departments, this issue contains the following articles: The foreign squid fishery off the Northeast United States coast; Optimal fish shipments from Kuala Trengganu, Malaysia; The economic feasibility of assuring U.S. grade A quality of fresh seafoods to the consumer; and Barge transportation of juvenile salmonids on the Columbia and Snake Rivers, 1977.

PB80-126493
(Order as PB80-126485, PC **A03**/MF **A01**)
National Marine Fisheries Service, Gloucester, MA.
The Foreign Squid Fishery Off the Northeast United States Coast,
David J. Kolator, and Douglas P. Long. Jul 79, 16p NOAA-79102301-1
Included in Marine Fisheries Review, v41 n7 p1-15 Jul 79.

During the past 5 years, the foreign fleet has taken an average of 50,000 metric tons (t) of squid per year. The 1978 optimum yield of squid has been set at 79,000 t (29,000 t of Illex, short-finned squid, and 19,000 t of Loligo, long-finned squid, foreign allocation). This leaves 31,000 t of squid for exploitation by the U.S. fishing industry. The New England Fisheries Development Program (1977) Report of Progress for 1977 outlined the problems of developing a domestic squid fishery. One problem was the limited experience by U.S. fishermen in capturing squid. The following is a presentation of the foreign squid fishery off the northeastern U.S. coast. The objective of these observations is to increase the awareness of foreign squid fishing practices and to abet the development of a domestic squid fishery along the eastern U.S. coast.

PB80-126501
(Order as PB80-126485, PC **A03**/MF **A01**)
National Univ. of Malaysia, Bangi.
Optimal Fish Shipments from Kuala Trengganu, Malaysia,
Nik Hashim Nik Mustapha, and Hiroshi Yamauchi. Jul 79, 5p NOAA-79102301-2
Prepared in cooperation with Hawaii Univ. at Manoa, Honolulu. Water Resource Research Center.
Included in Marine Fisheries Review, v41 n7 p16-19 Jul 79.

There is evidence that significant economic gains in terms of transportation cost savings may be possible from more efficient shipment patterns of fresh fish from supply points to consumption centers around Peninsular Malaysia. This indication comes from analytical results in the case of the Kuala Tregganu fishery. An optimal shipment pattern can lead to potential savings of M$5,700 per month in total transportation cost for this single fishery. If similar potential savings exist for other fisheries throughout the peninsula, the economic savings for the fresh fish industry may easily range around M$1 million per year.

PB80-126527
(Order as PB80-126485, PC **A03**/MF **A01**)
National Marine Fisheries Service, Seattle, WA. Northwest and Alaska Fisheries Center.
Barge Transportation of Juvenile Salmonids on the Columbia and Snake Rivers, 1977,
George T. McCabe, Jr., Clifford W. Long, and Donn L. Park. Jul 79, 8p NOAA-79102301-4
Included in Marine Fisheries Review, v41 n7 p28-34 Jul 79.

During the spring of 1977 the National Marine Fisheries Service, in cooperation with the U.S. Army Corps of Engineers, used two cargo tank barges to transport juvenile salmonids down the Snake and Columbia Rivers (through as many as eight dams) to safe release sites in the Lower Columbia River. Barge design and performance are described. The transported Pacific salmon, Oncorhynchus sp., and steelhead trout, Salmo gairdneri, were continually supplied with fresh river water pumped through the barge. A total of 3,517,242 juvenile Pacific salmon and steelhead trout were hauled on the barges.

PB80-129786 PC$16.00/MF **A01**
Gulf Coast Research Lab., Ocean Springs, MS. Botany Section.
A Phytosociological Study of Horn and Petit Bois Islands, Mississippi.
Final rept.,
Lionel N. Eleuterius. 1 May 79, 237p NPS/CR-80/01
Contract NPS-CX-5000-6-0993
Color illustrations reproduced in black and white.

The floristics and plant ecology of Horn and Petit Bois Islands, Gulf Islands National Seashore, Mississippi, were studied from 1976 through 1978. A total of 283 species of vascular plants were collected from Horn and Petit Bois islands. Plant communities were delineated into marsh, meadow or high marsh, beach and relict dunes and woodland. Vegetational composition of each plant community was determined, with marshes having the greatest diversity of species and relict dunes the least. No significant difference in the floristic composition of plant communities was found on eastern, central and western portions. Successional relationships between plant communities appear to depend on elevational changes produced by sand deposition or erosion and modification of land configurations.

PB80-131238 PC **A10**/MF **A01**
National Marine Fisheries Service, Seattle, WA.
Fishery Bulletin. Volume 77, Number 2, April 1979.
Apr 79, 206p NOAA-79102302
See also Volume 77, Number 1, PB-300 727.

This issue of the Fishery Bulletin contains the following articles: Aggregation and fishery dynamics; a theoretical study of schooling and the purse seine tuna fisheries; Shallow marsh habitats as primary nurseries for fishes and shellfish, Cape Fear River, NC; Larval development of the Cuban stone crab, Menippe nodifrons; Assessment of composition of stock mixtures; Behavior and ecology of the bottlenose dolphin, Tursiops truncatus, in the South Atlantic; Growth of northern anchovy, Engraulis mordax, larvae in the sea; A linear programming approach to determining harvesting capacity: a multiple species fishery; Some aspects of the biology of deep-sea lobsters of the family Polychelidae from the western North Atlantic; Reproduction in the blue shark, Prionace glauca; Mortality estimates for the New Zealand rock lobster, Jasus edwardsii; and Walleye pollock, Theragra chalcogramma: physical, chemical, and sensory changes when held in ice and in carbon dioxide modified refrigerated seawater.

PB80-131246
(Order as PB80-131238, PC **A10**/MF **A01**)
British Columbia Univ., Vancouver. Dept. of Mathematics.
Aggregation and Fishery Dynamics: A Theoretical Study of Schooling and the Purse Seine Tuna Fisheries,
Colin W. Clark, and Marc Mangel. Apr 79, 22p NOAA-79102302-1
Contract NOAA-03-06-208-35341
Prepared in cooperation with Center for Naval Analyses, Alexandria, VA.
Included in Fishery Bulletin, v77 n2 p317-337 Apr 79.

The study describes mathematical models of exploited fish stocks under the assumption that a certain portion of the stock becomes available through a dynamic aggregation process. The surface tuna fishery is used throughout as an example. The effects of aggregation on yield-effort relationships, indices of abundance, and fishery dynamics are discussed. Various management implications of the models are also discussed.

PB80-131303
(Order as PB80-131238, PC **A10**/MF **A01**)
National Marine Fisheries Service, Washington, DC. Office of Resource Conservation and Management.
A Linear Programming Approach to Determining Harvesting Capacity: A Multiple Species Fishery,
Robert A. Siegel, Joseph J. Mueller, and Brian J. Rothschild. Apr 79, 10p NOAA-79102302-7
Included in Fishery Bulletin, v77 n2 p425-433 Apr 79.

The U.S. Fishery Conservation and Management Act of 1976 (P.L. 94-265) requires that fishery management plans specify the capacity of a fishing fleet. However, the Act does not provide a definition of capacity. This paper considers some of the problems of defining and measuring capacity in the harvesting sector of the fishing industry and suggests an estimation procedure. A linear programming model is used to estimate the economic capacity of a fishing fleet. The model provides estimates of the expected output in a multiple species fishery.

PB80-131337
(Order as PB80-131238, PC **A10**/MF **A01**)
Ministry of Agriculture and Fisheries, Wellington (New Zealand). Fisheries Research Div.
Mortality Estimates for the New Zealand Rock Lobster, 'Jasus edwardsii',
John H. Annala. Apr 79, 11p NOAA-79102302-10
Included in Fishery Bulletin, v77 n2 p471-480 Apr 79.

The instantaneous total mortality rate and instantaneous fishing mortality rate were estimated for an exploited population of male New Zealand rock lobster, Jasus edwardsii. Instantaneous total mortality rate estimates were made from the seasonal size-frequency distribution of landed rock lobsters using three different methods and ranged from 0.64 to 1.07.

PB80-132434 PC **A04**/MF **A01**
Louisiana Wildlife and Fisheries Commission, New Orleans.
To Rear Striped Bass for Release in an Estuarine System.
Completion rept. Jul 75-Sep 79,
Steve Hein. Dec 79, 68p NOAA-79120709

Striped bass, Morone saxatilis, were reared and stocked into Barataria Bay, an estuarine system located along the southeast coast of Louisiana. Over a five-year period (1975-1979) 160,000 fingerling bass were introduced into the system. Commercial fishermen reported capturing stripers, but only one was seen and positively identified by biologists. It is uncertain if fish captured necessarily came from this stocking attempt. Various rearing techniques were evaluated.

PB80-133986 PC **A05**/MF **A01**
State Univ. of New York at Stony Brook. Marine Sciences Research Center.
An Aquaculture Pilot Plant for Lobsters,
Larry S. Turner, John W. Zahradnik, and Orville W. Terry. 1979, 82p NOAA-79120703
Also pub. as New York Sea Grant Inst., Albany, Report No. NYSG-RS-79-24. Prepared in cooperation with Massachusetts Univ., Amherst. Dept. of Mechanical Engineering.

A major component of the proposed lobster-culture facility is heated waste water from a power plant. The warm water makes production feasible by speeding lobster maturation. This facility also cultures seaweeds that supply valuable products for food and pharmaceutical industries. Plans for the facility are described in detail. This study analyzes a marine aquaculture complex to operate in conjunction with the Long Island Lighting Company (LILCO) nuclear power plant at Shoreham, New York.

PB80-134737 PC **A07**/MF **A01**
South Carolina Wildlife and Marine Resources Dept., Charleston. Marine Resources Center.
Development of Fishery Management Plans for Selected Anadromous Fishes in South Carolina and Georgia.
Special scientific rept.,
Glenn Ulrich, Nan Chipley, John W. McCord, David Cupka, and James L. Music, Jr. Nov 79, 143p MRC-SSR-14, NOAA-79112312
Prepared in cooperation with Georgia Dept. of Natural Resources, Atlanta. Coastal Fisheries Office Contribution Number 31.

Major declines in commercial landings of Atlantic coast anadromous species suggested the advisability of conducting a comprehensive survey of anadromous fish stocks and development of management plans for these species in South Carolina and Georgia. The anadromous species considered for plan development in approximate order of their fisheries importance and the emphasis given them in this report are: the American shad, Alosa sapidissima; hickory shad, Alosa mediocris; blueback herring, Alosa aestivalis; and the striped bass, Morone saxatilis. This study compiles and summarizes life history information for each species and provides an accurate assessment of stock status and fisheries conditions.

PB80-135403 PC **A03**/MF **A01**
Alabama Dept. of Conservation and Natural Resources, Montgomery.
Striped Bass, 'Morone saxatilis', Production and Stocking Experiments in Coastal Alabama.
Completion rept. Oct 76-Sep 79,
R. Vernon Minton. Dec 79, 39p NOAA-79120701
See also PB-264 652.

Although brood striped bass were collected during all segments of the project, spawning of broodfish was not achieved until 1979. Seventy adult brood stripers were captured in February-March 1979 from which 11.86 million eggs were taken and 1.35 million fry successfully hatched. During the reporting period, 2,192,962 fingerlings were reared and 2,102,603 released by personnel into Alabama coastal waters. An increase in fry stocking density/production pond from 625,000/ha to 1,250,000/ha yielded an increase of over 87,000 fingerlings/ha, but decreased the percent survival. A total of 4,304 advance fingerlings was cultured during this reporting period from which 988 were of sufficient size to tag. Total striped bass stocking during this reporting period including fingerlings was 2,865,907.

PB80-137789 PC **A02**/MF **A01**
Maine Univ., Walpole. Ira C. Darling Center for Research, Teaching and Service.

Formulation of Artificial Diets for Feeding Lobster ('Homarus americanus') Held in Pounds.
Technical rept.,
Margie Lee Gallagher, Robert C. Bayer, Dale F. Leavitt, and James H. Rittenburg. 1979, 22p
MSG-TR-46-79, NOAA-79120706
Grant NA-79-AA-D-00057

From the studies presented and discussed, several conclusions were drawn: (1) Calcium-phosphorus ratios in artificial diets can affect growth (weight gain) in adult lobsters; (2) No mineral mix is necessary in artificial diets formulated from conventional feed sources as long as the calcium-phosphorus ratio in the feed mixture is near 1.0; (3) Mineral supplementation of artificial diets fed to soft shell lobsters does not significantly affect weight gain in these lobsters; (4) Adult and juvenile lobsters fed artificial diets with varying protein-energy ratios showed best weight gain on those diets with the lowest protein-energy ratios; and it is possible to formulate an artificial diet from conventional feed sources which will result in growth as good as, or better than, herring under pound conditions. Such a diet is presently being fed in commercial pounds.

PB80-930400 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Structural and Functional Aspects of Cell Membranes.
Cancergram CB06.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The Cancergram includes studies that elucidate membrane structure, function and composition of normal and transformed cells. Abstracts include concerned investigations on biophysical and biochemical properties, adhesion and cell interaction, transport processes, receptor analysis and membrane probes. In general, abstracts describing tumor and other cell surface antigens (covered by Cancergram CB05) are excluded, unless information on the biochemical composition of these antigens is related to membrane structure.

PB80-932100 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cell Biology: Growth Regulation, Differentiation.
Cancergram CB16.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The scope of this Cancergram includes factors which have significant effects on growth and differentiation of normal and neoplastic cells in vivo and in vitro. The scope centers on the production, physical characteristics, and action of these growth regulatory factors in human and animal model systems. Emphasis is placed on factors which are endogenously produced, including chalones, prostaglandins, polyamines, and other serum and cellular factors; however, certain exogenous agents (such as nutritional factors, tumor promotors, and certain viruses) which have a principal effect on cell growth and differentiation are selectively covered. Of peripheral interest are studies involving agents that directly affect the production or function of growth factors. Papers on steroid hormones and cyclic nucleotides are included only if they relate to regulation of growth or differentiation. Other papers pertaining to the biology of steroid hormones and cyclic nucleotides appear in Cancergrams CB07 and CB14, respectively. The characterization and measurement of cell growth and cell replication are not within the scope of this Cancergram: these topics are covered by Cancergram CB09.

PB80-932500 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Molecular Biology: DNA.
Cancergram CB25.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The Cancergram covers most aspects of DNA metabolism in normal and neoplastic cells. Emphasis is on mechanisms of DNA replication and repair, and on DNA structure, sequence, and modification. Studies of chromatin and nucleosome structure and modification are included; however, studies emphasizing the associated nuclear proteins are covered in Cancergram CB27, and cytogenetic studies are the topic of Cancergram CB12. As the primary focus of this Cancergram is on cellular processes, inclusion of studies of viral DNA metabolism is limited to those which may elucidate basic aspects of cellular DNA metabolism. DNA viruses and viral replication are comprehensively covered by Cancergrams CB04 and CB11. Coverage of DNA repair focuses on mechanisms of repair rather than the induction of damage by chemicals or radiation, topics already covered by Cancergrams CK11 and CK06. DNA as template for RNA transcription is also excluded, as transcription is specifically covered in Cancergram CB26.

PB80-932600 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Molecular Biology: RNA.
Cancergram CB26.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

This Cancergram covers the isolation, characterization, synthesis, modification, and degradation of RNA in normal and cancer cells. Characterization and measurement of cellular levels of heterogeneous nuclear RNA, messenger RNA, ribosomal RNA, and transfer RNA are of central interest. Studies of the mechanism and control enzymes involved in RNA metabolism are also included. The cellular process of translation is covered in Cancergram CB27. As the primary focus of this Cancergram is on cellular RNA, studies on viral nucleic acids are included only when they may illuminate aspects of cellular RNA metabolism. This and other cancer-related aspects of the RNA viruses are comprehensively covered in Cancergrams CB22 (Cell Biology and Animal Studies) and CB23 (Molecular Biology).

6E. Clinical Medicine

AD-A078 292/0 PC **A04**/MF **A01**
Clemson Univ SC Coll of Engineering
An Experimental Evaluation of Selected Rewarming Therapies for the Treatment of Profound Accidental Hypothermia. Part II.
Final rept. 5 Jun 78-30 Jun 79 on Phase 3,
R. Michael Harnett, Edward M. O'Brien, Fred R. Sias, and James R. Pruitt. 27 Aug 79, 60p
USCG-D-65-79-PT-2
Contract DOT-CG-72074-A

This report summarizes the results of rewarming experiments performed with mildly cooled volunteers. Rewarming therapies are studied which can be used for treatment of hypothermia at the rescue site. Other therapies are included in the study to serve as standards of comparison for the 'portable' ones. The results are analyzed in the context of expected human responses to arrive at comparative evaluations of the therapies for use in the treatment of 'profound' hypothermia. (Author)

AD-A078 300/1 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Maternal and Fetal Prostaglandin Levels during Acute Maternal Hypoxia in the Pregnant Ewe.
Medical research progress rept.,
P. E. Lewis, R. C. Cefalo, J. S. Naulty, J. R. Fletcher, and P. W. Ramwell. 1978, 5p Rept no. NMRI-78-132
Pub. in Advances in Prostaglandin and Thromboxane Research, v4 p133-135 1978.

No abstract available.

AD-A078 302/7 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Scanning Electron Microscopy of Spironucleus (Hexamita) muris Infection in Mice.
Medical research progress rept.,
David L. Eisenbrandt, and Robert J. Russell. 1979, 9p Rept no. NMRI-79-21
Pub. in Scanning Electron Microscopy, 3 p23-27 1979.

No abstract available.

AD-A078 303/5 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Human and Mouse Specific T-Cell Helper Factors Assayed in Vivo and in Vitro: Implications for Human Ir Genes.
Medical research progress rept.,
J. N. Woody, N. J. Zvaifler, A. Reese, A. Ahmed, and R. Hartzman . 1979, 9p Rept no. NMRI-79-34
Pub. in Transplantation Proceedings, v11 n1 p382-388 Mar 79.

No abstract available.

AD-A078 304/3 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Aeromonas Primary Wound Infection of a Diver in Polluted Waters.
Medical research progress rept.,
S. W. Joseph, O. P. Daily, W. S. Hunt, R. J. Seidler, and D. A. Allen. 18 Apr 79, 7p Rept no. NMRI-79-57
Pub. in Jnl. of Clinical Microbiology, v10 n1 p46-49 Jul 79.

No abstract available.

AD-A078 309/2 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Sporozoite-Induced Malaria: Therapeutic Effects of Glycolipids in Lipsomes.
Carl R. Alving, Imogene Schneider, Glenn M. Swartz, Jr., and Edgar A. Steck. 1 Feb 79, 5p
Pub. in Science, v205 p1142-1144, 14 Sep 79.

No abstract available.

AD-A078 312/6 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Distribution of Lyb-4.1 Other Membrane Antigens on Murine Lymphoid Tumors.
Medical research progress rept.,
Rawleigh C. Howe, Richard S. Nelson, Kevin M. Rogan, Aftab Ahmed, and John J. Aiken. 12 Jan 79, 7p Rept no. NMRI-79-59
Pub. in Jnl. of the National Cancer Institute, v63 n2 p375-378 Aug 79.

No abstract available.

AD-A078 360/5 PC **A05**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
Recent Advances in Aeronautical and Space Medicine.
Conference proceedings,
Raymond H. Murray. Sep 79, 82p Rept no. AGARD-CP-265
Presented at the Aerospace Medical Panel's Specialists' Meeting, Brussels, Belgium, 22-26 Jan 79.

Two papers presented at the meeting of the Aerospace Medical Panel in Brussels, on the 26 January 1979, provide valuable data gained from the experience with the selection and training of Space Shuttle Payload Specialists as well as a review of physiological problems expected during the forthcoming Space Shuttle operation because of the enviromental stress of space life. Three other papers given in this meeting session are intended to update the Aerospace Specialist in the selection aircrew (including female personnel), basic science concepts and clinical operational requirements of advanced oxygen systems designed for future high-performance combat aircraft and - for the first time at AGARD meetings - medical and physiological problems faced during the development and operation of commercial supersonic vehicles.

AD-A078 413/2 PC **A03**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science

Design of a Program for Expert Diagnosis of Acid Base and Electrolyte Disturbances,
Ramesh S. Patil. May 79, 42p Rept no. MIT/LCS/TM-132
Contract N00014-75-C-0661

This research develops the diagnostic component of an interactive system for providing expert advice for the diagnosis, therapy and ongoing management of patients with acid-base and electrolyte disturbances. We have developed a hierarchic representation of a patient's illness which unifies the known facts about the patients, their suspected interrelationships, the hypotheses and how hypotheses account for various known and hypothesized facts. An expectation driven problem solver based on the hypothesize and reformulate paradigm performs the diagnosis. (Author)

AD-A078 500/6 PC **A02/MF A01**
Army Inst of Dental Research Washington DC
Analysis of Dental Causalties in Prolonged Field Training Exercises,
Thomas F. Payne, and William R. Posey. 1978, 19p

The field dental records of all soldiers reporting to dental sick call from Joint Readiness Exercises Empire Glacier-78 and Brave Shield-17 were analyzed to determine the incidence, causal factors, and amount of loss duty time due to dental emergencies. Three hundred sixty Army personnel presented as dental emergencies from a total population of 24,500 during a 39-day period, an incidence of 14.7 dental emergencies per 1000 troops. The calculated annual incidence of dental emergencies was 167.36 per 1000 troops. The main causes were caries (52 percent) and gingival conditions (22 percent). The remaining 16 percent included fractured teeth (5 percent), broken prostheses (4 percent), and miscellaneous conditions (7 percent). Dental emergencies comprised 21.5 percent of the total medical sick call. Seventy-four percent of the dental emergencies were judged to be preventable. The estimated lost duty time was 318 days for an observed rate of 13 days per 1000 troops and an estimated annual rate of 121.5 per 1000 troops. The most significant factor affecting lost duty time for treatment appeared to be the availability of transportation to and from the treatment facility. (Author)

AD-A078 584/0 PC **A06/MF A01**
Naval School of Health Sciences Bethesda MD
Assignment Element Difficulty as a Basis for Nursing Personnel Staffing at Naval Hospitals. Phase I. Project Report.
Interim rept. Oct 78-Sep 79,
John E. Montgomery, and Mary Kelly. Sep 79, 107p Rept no. RP-3-79

The purpose of this research is to examine the relationship between the quality of patient care and the difficulty of nursing assignments on patient units at naval hospitals. Phase I of the study has concentrated on adaptation and testing of several research tools for use in quantifying the quality of nursing care and the difficulty of nursing assignments on general medical and surgical units. These tools include a process-oriented quality questionnaire, a patient classification system, a difficulty assessment instrument to be used with the psychological scaling technique of constant-sum paired comparisons, and a work sampling methodology to identify how nursing personnel divide their time among various categories of activities. The above research tools were used during a 35-day data collection period on three patient units at a single naval hospital. Subsequent data analysis indicates that a demonstrable relationship exists between patient care quality and the average difficulty of patient care assignments and that this relationship has potential as a basis for nursing personnel staffing systems at naval hospitals. (Author)

AD-A078 600/4 PC **A03/MF A01**
Armed Forces Inst of Pathology Washington DC
Army Medical Research and Development Technical Report.
Annual progress rept. 1 Oct 77-30 Sep 78,
Joseph M. Ballo. 1 Oct 78, 26p

The research projects reported in this Progress Report are as follows: Project: Army Aviation Medicine, Project: Environmental Quality Protection, Project: Lesions in Animals Fed Enzyme Inactivated Frozen and Irradiated Meats.

AD-A078 608/7 PC **A02/MF A01**
Army Inst of Dental Research Washington DC
Molluscum Contagiosum of the Lower Lip: Report of a Case,
John F. Nelson, and Peter J. Tsaknis. 6 Dec 79, 11p

A rare case of molluscum contagiosum of the lower lip is presented. Its clinical and microscopic features are discussed and a differential diagnosis is suggested. (Author)

AD-A078 609/5 PC **A02/MF A01**
Army Inst of Dental Research Washington DC
Evaluation and Patient Acceptance of a Mechanical Dental Flossing Device as Compared to Hand-Held Floss.
Rept. for 1977-1979,
Ronald F. Barton, Jr., and Barbara Diamond. Oct 79, 16p

This study had two objectives. First - to ascertain the relative cleaning efficacy of a mechanical floss-holding device and an hand-held waxed dental floss and secondly, to determine the patient acceptance of each of these methods of using dental floss. It was illustrated that floss held by a mechanical device was as effective as regular hand-held floss in reducing gingival bleeding. Also, patients that expressed a preference preferred the mechanical flossing device by a ratio of four to three. (Author)

AD-A078 610/3 PC **A02/MF A01**
Army Inst of Dental Research Washington DC
Intraoral Monomorphic Adenoma,
Carson L. Mader, and John F. Nelson. 1979, 18p

A case report of an intraoral monomorphic adenoma is presented and the literature reviewed. The clinical manifestations, histology and treatment of this rare salivary gland tumor are discussed. Important clinical diagnostic points are stressed and the authors suggest this tumor be referred to as basaloid monomorphic adenoma. (Author)

AD-A078 762/2 PC **A02/MF A01**
Naval Medical Research Unit No 2 APO San Francisco 96263
Influenza Surveillance in Manila, Republic of the Philippines during 1976-1977,
Thomas G. Ksiazek, James G. Olson, Alberto K. Alcantara, and Cesar V. Uylangco. 1979, 12p Rept no. NAMRU-2-TR-822
Pub. in Philippine Jnl. of Microbiology and Infectious Diseases, v8 n1 p33-40 Jan-Jun 79.

No abstract available.

AD-A078 763/0 PC **A02/MF A01**
Naval Medical Research Unit No 2 APO San Francisco 96263
Epidemic Dengue Hemorrhagic Fever in Rural Indonesia. I. Virological and Epidemiological Studies.
D. J. Gubler, W. Suharyono, I. Lubis, S. Eram, and J. Sulianti Saroso. 29 Jan 79, 14p Rept no. NAMRU-2-TR-823
See also Part 2, AD-A078 764. Pub. in American Jnl. of Tropical Medicine and Hygiene, v28 n4 p700-710 1979.

No abstract available.

AD-A078 764/8 PC **A02/MF A01**
Naval Medical Research Unit No 2 APO San Francisco 96263
Epidemic Dengue Hemorrhagic Fever in Rural Indonesia. II. Clinical Studies,
S. Eram, Y. Setyabudi, T. I. Sadono, D. S. Sutrisno, and D. J. Gubler. 29 Jan 79, 10p Rept no. NAMRU-2-TR-824
See also Part 1, AD-A078 763. Pub. in American Jnl. of Tropical Medicine and Hygiene, v28 n4 p711-716 1979.

No abstract available.

AD-A078 765/5 PC **A02/MF A01**
Naval Medical Research Unit No 2 APO San Francisco 96263
Absence of Angiostrongylus spp. in Rodents of Central Sulawesi, Indonesia,
W. P. Carney, M. Sudomo, J. Putrali, and P. F. D. Van Peenen. 1978, 6p Rept no. NAMRU-2-TR-827
Pub. in Southeast Asian Jnl. of Tropical Medicine and Hygiene, v10 n1 p147-149 Mar 79.

No abstract available.

AD-A078 767/1 PC **A02/MF A01**
Walter Reed Army Inst of Research Washington DC
Diagnosis of Cutaneous Leishmaniasis by in Vitro Cultivation of Saline Aspirates in Schneider's Drosophila Medium,
Larry Hendricks, and Norman Wright. 11 Feb 79, 5p
Pub. in American Jnl. of Tropical Medicine and Hygiene, v28 n6 p962-964 1979.

No abstract available.

AD-A078 770/5 PC **A02/MF A01**
Naval Medical Research Unit No 2 APO San Francisco 96263
Salmonellosis in Indonesia: Phage Type Distribution of Salmonella typhi,
Warren R. Sanborn, J. -F. Vieu, S. Komalarini, Sinta, and R. Trenggonowati. 15 May 78, 14p Rept no. NAMRU-2-TR-815
Pub. in Jnl. of Hygiene, v82 p143-153 1979.

No abstract available.

AD-A078 780/4 PC **A02/MF A01**
Florida State Univ Tallahassee Dept of Statistics
The Multivariate Normal Behaviour of a Symmetric m-Dimensional Simple Epidemic.
Technical rept.,
Naftali A. Langberg. Oct 79, 25p FSU-STATISTICS-M523, TR-D-40-ARO, ARO-16713.3-M
Contract DAAG29-79-C-0158

We consider a group of n susceptible individuals who are exposed to m contagious diseases. The progress of the epidemic among the individuals is modeled by a stochastic process X sub n (t) identical with (X sub n,1 (t), ..., X sub n,m (t)), t in (0, infinity). The components of X sub n (t) describe the number of infective individuals with the respective disease at time t. For a class of epidemic models named symmetric m-dimensional simple epidemics we establish, with a suitable standardization, the asymptotic normal convergence of X sub n (t) as n approaches infinity for t in (0, infinity).

AD-A078 906/5 PC **A03/MF A01**
Center for Blood Research Boston MA
Factors Affecting the Stability of Cryogenically Preserved Human Granulocytes.
Annual technical rept. 1 Dec 78-30 Nov 79,
Fabian J. Lionetti, F. L. Luscinskas, S. M. Hunt, C. R. Valeri, and A. B. Callahan. 18 Dec 79, 36p
Contract N00014-73-C-0100

Human granulocytes free of other cell types were obtained by counterflow centrifugation, cryogenically preserved, and studied for stability and function after thawing. Isolation of granulocytes by counterflow centrifugation was optimal at reduced temperatures (4 -10C) in phosphate buffered saline (or Ca++ free buffers) at pH 7.1. Granulocytes could not be cryogenically preserved in plasma or serum. Heating or prefreezing of serum was ineffective, but dialysis or addition of EDTA overcame the destructive effect of serum. Neither treatment was an improvement over the standard freeze procedure using buffered albumin and cryoprotective components. Beta-mercaptoethanol added to the freezing medium caused the production of a single homogeneous population of osmotically inert, non-viable, ethidium reactive granulocytes. This suggests that osmoregulation by granulocyte membranes is a critical requirement for cryopreservation. Preservation efficiency is species dependent, increasing in the order of human, baboon, guinea pig, and dog. Dog granulocytes can be stored for at least 8 months in liquid nitrogen with small loss of cells and functionality. The present efficiency of preservation of human granulocytes for 3-4 weeks of liquid nitrogen storage is 90-100% morphological and 40% functional recovery. Attempts to increase stability of thawed

granulocytes with other additions to our current procedure have so far proved fruitless. These have consisted of inosine, adenine, pyruvate, gluconate, vitamin C, beta-mercaptoethanol, p-phenylmethyl-sulfonylfluoride, and mannitol.

HRP-0026942/3 Not Available NTIS
Delaware County Community Coll., Media, PA.
Dean's Eye View of Health Services.
Kenneth A. Miller. 1978, 3p
Presented at the Annual Meeting, American College Health Association (55th), Philadelphia, PA, April 27, 1978.
Pub. in Jnl. of American College Health Association v26 n5 p260-262 Apr 78.

College health services are discussed in terms of traditional program expectations, community college health programs, integration of student health services into the mainstream of the college program, and development of a comprehensive student health services program. The traditional college health service program featured compilation of routine student health data from questionnaires and/or required physicals, routine physical examinations for athletes on an annual and pregame basis, control of contagious diseases, student referral, first aid, and monitoring of food service operations; often schools had their own infirmaries. Some services still exist in this form. The varied student population requires a wide range of approaches and services -- services which should be provided in a nonjudgmental fashion. College health service nursing staff are considered to be particularly valuable in integrating student health services into the general college program because of both institutional and personal relationships which develop. Contact and interactions among counseling services, faculty groups, student groups and individuals, parents, athletes, and day-care centers are recommended. Development of a comprehensive student health service is advocated in the form of an educationally sound outreach program which stresses health awareness. Successful development is dependent upon marketing approaches to potential users, including the administration, faculty and students.

HRP-0027207/0 Not Available NTIS
Utah Univ., Salt Lake City. Dept. of Community and Family Medicine.
Toward the Measurement of Primary Care.
Chris Holmes, Robert L. Kane, Marilyn Ford, and Jess Fowler. 1978, 21p
Pub. in Milbank Memorial Fund Quarterly/Health and Society v56 n2 p231-251 1978.

The findings of a study conducted to define family-centered primary care and to assess whether a formal residency for the family physician improves performance are outlined. The test sample consists of 14 graduates of the University of Utah experimental family practice program (RT) matched with experience-trained controls (PE). Judgment criteria (continuity, coordination and comprehensiveness of care, and family orientation) are based on patient data analyzed by faculty members, and measurement of the sample on a 1977 in-office review of records for 50 patients per physician by 2 qualified persons. The results show little difference between RT and PE physicians. Both groups score well in continuity of care and closed-loop referral rates (i.e. information return after referrals), but neither group performs well in recording of comprehensive medical and family information beyond specific complaints, although RT physicians do somewhat better. The family care rate is higher for RT physicians. The negligible performance difference between RT and PE physicians may be in part attributable to the experimental nature of residency programs and to the high motivational level of controls, but the evidence suggests the feasibility of such alternatives to residency training as supervised limited licensure programs for recent medical graduates. Three figures, seven tables, and a bibliography are included.

HRP-0027344/1 Not Available NTIS
University of Southern California, Los Angeles. School of Public Administration.
How Nursing Administrators View Conflict.
Robert C. Myrtle, and Eli Glogow. 1978, 4p
Pub. in Nursing Research v27 n2 p103-106 Mar-Apr 78.

The views of nursing administrators on positive and negative aspects of conflict are analyzed on the basis of data collected in a 1975 survey of 51 nursing administrators. The survey was conducted during the conflict session of a continuing education course at the University of Southern California School of Medicine. The results indicate that the administrators view conflict in a fairly positive light (271 positive and 259 negative responses). In their opinion, conflict affects people more than it does tasks. Most positive effects cited have to do with problem resolution. Negative consequences relate to diminished productivity. The findings suggest that conflict is regarded by this group as requisite for growth, not as a sign of organizational pathology, and is considered a long-term means to increase productivity. It is cautioned that nursing administrators in general must learn to weigh these long-term benefits rather than to attempt to reduce conflict through organizational structure and thus aggravate the nonproductive conflict situation. Because of expanding team use and role change, nursing administrators must master conflict management to revitalize organizations and to improve both workers' health and health care while minimizing dysfunction. A bibliography and three tables are included.

HRP-0027489/4 Not Available NTIS
Montreal Univ (Quebec).
Nurse and the Medical Assistant -- Functions and Status.
Jeannine Baudry. 1978, 5p
Pub. in International Nursing Review v25 n4 p108-112 Jul-Aug 78.

A comparison was made between nurses and medical assistants to determine if their roles are complementary or overlapping. The hypotheses of the study were: 1) at the time when they begin their respective studies, medical assistants and nurses have a different educational background; 2) the programs of study for the nurse and the medical assistant are different; and 3) the functions for which nurses and medical assistants are educated are the same. Questionnaires were sent to institutions likely to have one of the two programs. Replies were grouped according to five types of information: general information; preparation prior to admission, candidates admitted, and diplomas granted; content of the program, types of training and teaching personnel; functions and work setting; and estimation of the professional status of the graduates. The results of the survey, analyzed on the basis of the regions of the World Health Organization, are presented. The first two hypotheses were confirmed by the study; the third was partially disproved. A figure presents the replies to the questionnaire by region.

HRP-0027508/1 Not Available NTIS
Missouri Univ.-Kansas City.
Role of the Pharmacist in Providing Clinical Pharmacy Services in the Emergency Department.
Robert M. Elenbaas. 1978, 3p
Presented at the Ninth Annual Professional Practice Conference, Canadian Society of Hospital Pharmacists, Toronto, Feb 8, 1978.
Pub. in the Canadian Jnl. of Hospital Pharmacy v31 n4 p123-125 Jul-Aug 78.

The liaison between clinical pharmacy and emergency medicine at three university-affiliated hospitals (Truman Medical Center (TMC) in Missouri, the University of Illinois, and the University of Nebraska) is described. TMC's program, which began in 1971, centers on a 'docent team' approach to medical education which utilizes physicians, residents and students, and a clinical pharmacist. Pharmaceutical consultation aims at designing, implementing, and monitoring patient-specific therapeutic plans using the most efficacious, least toxic, and most economical drugs available. Medical and nursing staff as well as patients are involved in educational activities related to drug use. A study conducted in June 1976 revealed that physicians rated the TMC activities and clinical pharmacy services in emergency medicine highly. Provision of information concerning drug therapy and of quality control and counsel was especially appreciated. Similar steps are being taken at the Universities of Illinois and Nebraska. In the future, it is expected that other institutions will be seeking to add a clinical pharmacist to their emergency staff. However, whether emergency medicine will qualify as a specialty within pharmacy remains to be seen.

HRP-0027514/9 Not Available NTIS
American Hospital Association, Chicago, IL.
Voluntary Effort (VE) -- Alive and Well on Its Way to Success.
Paul W. Earle. 1978, 3p
Pub. in Trustee v31 n9 p31-33 Sep 78.

This article contends that the Voluntary Effort (VE) program, designed to make better disciplined health resource management the responsibility of all parties, is well on its way to success in achieving its immediate goals. Behind it is a broad-based coalition of hospitals, physicians, health insurers, business, health suppliers, and consumer representatives. The fact that some skepticism and doubts continue to be voiced about VE may be the result of misconceptions about the program's impetus and intent. Rather than subverting the quality of health care, the program asks hospitals to manage limited resources by establishing priorities and weighing alternatives in the light of given objectives. Continued provision of high-quality care can only be accomplished through a combination of improved productivity, broader pooling of resources, and planning on a larger scale. Nor is the VE a bureaucratic self-policing mechanism initiated solely for the purpose of forestalling policing by others. Instead, the program is truly voluntary; performance standards are to be set by each provider in keeping with national and State goals and individual circumstances. The program's underlying goal is better disciplined management.

HRP-0027516/4 Not Available NTIS
Temple Univ., Philadelphia, PA.
Strategies for the Assessment of Productivity in Health Care.
Raymond P. Lorion. 1978, 7p
Pub. in Social Policy v9 n2 p35-41 Sep-Oct 78.

Techniques for studies which assess health care productivity in terms of needs, availability, and effectiveness are reviewed. Compromises are necessary in experimental control because of limitations imposed by factors affecting internal validity (history, maturation, testing, instrumentation, statistical regression, selection biases, experimental mortality), external validity (effects on a patient's response by measurement, experimental arrangement, and intervention), and by a number of fallacies interfering with the objective process. Needs assessment begins with the determination of whether the desired information is already available from Federal, State or local sources. Some of these sources are listed. Integration of existing data facilitates problem anticipation. Possible study strategies include the community survey, the key informant, the community forum, and nominal group approaches. For an inventory of resources, the information sources mentioned above should be consulted and procedural information on program functions and integration should be systematically collected. Effectiveness assessment requires a clear operational definition of the problem, the sample, the intervention, and the outcome measures. The selection of outcome measures should be based on stated goals. The evaluation design should maximize validity, employing pretesting and posttesting of clients, as well as a control group. A time-series design is useful for measuring the effect of a program over years.

HRP-0027517/2 Not Available NTIS
Harlem Hospital Center, New York.
Detection and Management of Hypertension by the Nurse Therapist.
George C. Branche, Mavis M. Streets, Victoria M. Dowdy, and Gerald E. Thomson. 1978, 3p
Pub. in Urban Health v7 n5 p23ff Jun 78.

A program for detection and management of hypertension by nurse therapists was initiated in 1975 at Harlem Hospital in New York City. Methods included training seven registered nurses, screening by nurses throughout the community with a mobile unit, referring patients, conducting a complete physical examination of patients with confirmed high blood pressure, controlling blood pressure with drug therapy, and monitoring therapy through frequent office visits. Results show that from July 1, 1975 to July 1, 1977, 23,197 people were screened and 515 persons, mostly black or

hispanic, were referred for hypertension management. Of 392 patients who remained with the program, blood pressure was controlled in 352. Diuretics alone were used in a high percentage of patients. The most frequent problems were hypokalemia and hyperuricemia, which nurse therapists could manage by adjusting dosages or changing diets. Nurses' efficiency and patients' acceptance of nurse therapists were excellent. Protocol was followed closely, control was achieved, the dropout rate was relatively low, and the program cost less than physician-staffed programs. Five tables are provided.

HRP-0027571/9 Not Available NTIS
Human Resource Development -- Emerging Asset for Hospital Management.
Charles K. Scoville. 1977, 15p
Pub. in Hospital and Health Services Administration v22 n1 p22-36 Winter 1977.

The origin, nature, and components of human resource development (HRD) are examined. HRD is said to be a blend of many different disciplines -- educational technology, management science, industrial engineering and industrial psychology -- with a behavioral emphasis. It is explained that the function of HRD is the identification, examination, and modification of those features in an individual's experience or environment which influence his ability or desire to interact productively with the employing organization. Possible components of an HRD function within a health care institution are listed and described. They are: 1) patient education; 2) employee education; 3) management training and development; 4) organization development; 5) job development; and 6) human resource accounting. HRD programs undertaken at various institutions are examined. In two of the three examples, reduction in the turnover rate was one of the most rewarding results of HRD. It is therefore maintained that because hospitals have a high turnover rate, a reduction would have a significant effect on employee morale and result in substantial savings.

HRP-0027573/5 Not Available NTIS
Public Health Service Hospital, Staten Island, NY.
Health Services for Foster Children -- Factors Associated With Health Care Costs.
Margaret R. Swire, and Florence Kavaler. 1978, 13p
Grant PHS-MC-R-3-60032
Pub. in Jnl. of Health Politics, Policy and Law v3 n2 p251-263 Summer 1978.

Factors associated with health care costs for foster children are discussed. An evaluative study of health services for foster children was carried out in New York City from 1971 to 1974. The relationships between the cost of care, the health needs of the children, and the structure and functioning of existing medical care programs provided by the agencies responsible for the care of the children are examined. It is suggested that the per capita costs among the facilities studied could be affected by interagency differences in the structure and organization of the care system, the quality and adequacy of the care provided, and health status and medical care needs of the children. The major factors associated with health care costs are identified as structural and functional. High per capita costs were found to be associated with such agency features as: centralization of health care services; multifunctionalism; large numbers of in-house medical and mental health staff; accurate, thorough and up-to-date records; close control over the records; close supervision of the child's medical care program; better, more frequent and more complete preventive health checkups; and more frequent screening and diagnostic testing. Tables and figures highlight the findings.

HRP-0027589/1 Not Available NTIS
Washington Univ., Seattle. Center for Health Services Research.
State of the Art of Health Services Research.
Stephen M. Shortell. 1978, 14p
Pub. in Program Notes n81 Sep 78. Available from Association of Univ. Programs in Health Administration, Suite 420, One Dupont Circle, Washington, DC 20036.

The Institute of Medicine's request for suggestions related to a working definition of the boundaries of health services research (HSR), the impact of HSR on public policy, areas needing additional research, and suggestions for improving future research is addressed. Distinctions are drawn between health policy research, which is said to include both original research investigations underlying a specific problem and research which provides information pertinent to alternative choices; and health policy analysis, which does not involve original investigations but pulls together existing information and data. It is pointed out that HSR is an applied area of investigative work which draws primarily on the social sciences. For the most part, HSR is able to do very little about the state of the art of social science theory and knowledge. Examples of the impact of HSR are provided. Examples of areas requiring further research are listed, as are suggestions for improving HSR.

HRP-0027590/9 Not Available NTIS
Institute of Medicine, Washington, DC.
Statement to Senate Subcommittee on Health and Scientific Research -- Health Services Research.
David A. Hamburg. 1978, 9p
Pub. in Program Notes n81 Sep 78. Available from Association of Univ. Programs in Health Administration, Suite 420, One Dupont Circle, Washington, DC 20036.

The statement presented by Dr. David A. Hamburg, President, Institute of Medicine, National Academy of Sciences, to the Senate Subcommittee of Health and Scientific Research, Health Services Research, is provided. The interests and concerns of the Institute of Medicine are outlined. It is pointed out that a great opportunity exists to improve the health of the public. For this to be done, science must be extended to the whole of the health care system. Three general factors affecting the health of the public are discussed: 1) medical care and other personal care by health professionals; 2) environmental conditions, historically important for health; and 3) individual behavior. The traditional sciences must be broadened, to include the sciences associated with public health, environment, and behavior as central concerns. It is suggested that this broadened field be designated as the health sciences. The health sciences should be concerned not only with deepening the foundations of basic knowledge, but with continuous monitoring of these advances for possible applications to clinical problems.

HRP-0027591/7 Not Available NTIS
Development of the Center for Health Services Research at the University of Washington.
Andrew K. Dolan, Lorabeth Lawson, Ira Moscovice, and Stephen M. Shortell. 1978, 9p
Pub. in Program Notes n81 Sep 78. Available from Association of Univ. Programs in Health Administration, Suite 420, One Dupont Circle, Washington, DC 20036.

The major activities and the structure and administrative environment of the Center for Health Services Research at the University of Washington are described. The center, one of five programs within the university's Department of Health Services, conducts a variety of activities aimed at providing health services system participants with the results of pertinent research. The center performs research activities which involve data gathering and hypothesis testing. These activities may be divided into three groups: internally funded research conducted by the staff, internally funded research conducted by others, and externally funded research. The research program is outlined. Other pertinent aspects of the center's program are delineated, e.g., educational activities. Doctoral students from economics, epidemiology, sociology, and other disciplines have the opportunity to obtain a minor area of concentration in health services research. Also discussed are technical assistance activities and dissemination efforts. Research results are made available through various publications. The center has disseminated three newsletters and eight policy research series monographs.

HRP-0027593/3 Not Available NTIS
Exeter Univ. (England). Inst. of Biometry and Community Medicine.
Operational Research Projects in Health and Welfare Services in the United Kingdom and Ireland.
Duncan Boldy, and David Clayden. 1978, 14p
Pub. in Program Notes v81 Sep 78. Available from Association of Univ. Programs in Health Administration, Suite 420, One Dupont Circle, Washington, DC 20036.

The state of operational research in health and welfare in Ireland and the United Kingdom in 1977 is reviewed. Data were made available through a register of current projects. These data are then compared with the data gathered through a similar register in 1972. Tables compare projects by type, main focus, problem areas, and methodology. It is noted that health and welfare operations research work has hardly been concerned at all with social service problems. The major focus of the work seems to have shifted from hospital-based tactical studies to more widely based strategic studies. The number of projects dealing with 'optimisation' is said to have decreased. Simulation seems to be increasing in popularity as a methodology. It is pointed out that the majority of operations research projects were described as using either simulation or applied common sense as the methodology. It is pointed out that the current health and welfare operations research project, as represented by the register of information, does not provide a direct measure of quality or the degree of success achieved in implementation. Further study is urged.

HRP-0027599/0 Not Available NTIS
Vancouver General Hospital (British Columbia).
Voluntary Accreditation -- The Best Choice.
L. O. Bradley. 1978, 3p
Pub. in Hospital Progress v59 n9 p56-58 1978.

Arguments are presented in favor of voluntary hospital standardization (accreditation). Voluntary accreditation is said to have mobilized all the components of the hospital to assure quality. The trustees, the hospital, and the medical staff are all involved. Accreditation is seen to benefit the patient, providing him with quality care. The proposal of accreditation under the government aegis would, it is noted, present difficulties and structural handicaps. The division of powers between Federal and State authorities is said to present a problem in promoting consistent national quality of care and service. It is also pointed out that if the government becomes involved, legislation will be followed by regulation, and regulation by rigidity. Rigidity is said to foster regression, which, it is explained, the consumer would find distasteful. A worthy alternative to voluntary accreditation has not yet been developed. It is felt that any other approach to accreditation is 'un-American'. Voluntary accreditation, unlike any other accreditation, is said to have captured the energy, efforts, and dedication of the providers of health care.

HRP-0027600/6 Not Available NTIS
Colorado Univ. Medical Center, Denver. Dept. of Physical Medicine and Rehabilitation.
Use of the Goal Attainment Scale in the Treatment and Ongoing Evaluation of Neurologically Handicapped Children.
F. Patrick Maloney, Penny Mirrett, Carole Brooks, and Karen Johannes. 1978, 7p
Pub. in American Jnl. of Occupational Therapy v32 n8 p505-511 Sep 78.

A study was undertaken to determine whether goal attainment scaling could be used to improve both the quality of treatment and the measurement of progress for six multiply handicapped children without increasing demand on therapists' time. Traditional developmental tests were compiled and baseline evaluations obtained. To make the reevaluation of the children easier, a Goal Attainment Scale (GAS) technique was utilized. The two advantages of the GAS -- that it could facilitate ongoing feedback for both the professionals and the parents and that it could update specific, individualized goals in each therapeutic area -- are discussed. Such information is said to be helpful to third-party payers. It is noted that after an initial period had elapsed, therapists were more accurate in their expectations about progress in treatment. Each child's therapy time was increased, without increasing costs or the therapist's preparation time. It is pointed out that reevaluation scores obtained on the GAS approached a normal, expected distribution. A discussion ensues about the possibility of extending the system to display treatment results more effectively, concisely, and objectively. Tables highlight the data presented.

HRP-0027604/8 Not Available NTIS
Kaiser-Permanente Medical Care Program, Oakland, CA.
Patient Data Acquisition.
Morris F. Collen. 1978, 4p
Pub. in Medical Instrumentation v12 n4 p222-225 Jul-Aug 78.

The benefits and disadvantages of using computer-connected terminals to acquire patient data are discussed. It is pointed out that data are acquired from the patient by direct interrogation, by physiological measurements, and by analysis of specimens, signals, and images. The most problematic method of acquisition is interrogation because of the lack of standardization of the patients' medical history, the complexities of computer programing, and the problems of man/machine interface. It is noted that as a means of standardizing data, many physicians are presenting their patients with questionnaires which they can administer themselves. The general experience with self-administered questionnaires is examined, mostly drawing upon the 25 years of activity reported in this field by the Kaiser-Permanente multiphasic health testing program. It is pointed out that there are two basic types of self-administered history taking devices, machine batch processed histories and interactive history takers. The advantages and disadvantages of both types are examined. Some recommendations for the ideal self-administered interactive history taker are made.

HRP-0027609/7 Not Available NTIS
Harvard Medical School, Boston, MA. Dept. of Psychiatry.
Issues Critical to the Survival of Community Mental Health.
Jonathan F. Borus. 1978, 7p
Grant PHS-MH-14124
Pub. in the American Jnl. of Psychiatry v135 n9 p1029-1035 Sep 78.

Some of the critical issues facing community mental health (CMH) are delineated. CMH has been criticized for: lacking priorities and boundaries; neglecting the difficult job of providing the therapeutic services needed to maintain severely ill and disabled psychotic patients in the community; being unwilling or unprepared to meet the needs of the large number of chronically ill patients returned to the community as a result of the public policy of deinstitutionalization; substituting quantity for quality care; and relegating evaluations to the least experienced clinicians. The reasons for these problems are explored and suggestions are made for correcting them. CMH is discussed in relationship to medicine and to the community. The psychiatrist's role in CMH is explored and it is pointed out that community mental health centers must rectify their unstable and inadequate reward system to lessen the turnover of psychiatrists. The response of psychiatry to the problems cited is said to be a principal determinant in the resolution of the CMH crisis and in the future direction and viability of CMH.

HRP-0027612/1 Not Available NTIS
RAND Corp., Santa Monica, CA. Dept. of Information Sciences.
Interactive Data Management and Analysis System for Clinical Investigators.
G. F. Groner, M. D. Hopwood, N. A. Palley, W. L. Sibley, and W. R. Baker. 1978, 16p
Contract N01-RR-5-2111
Pub. in Jnl. of Laboratory and Clinical Medicine v92 n3 p325-340 Sep 78.

The development of a minicomputer-based system is recounted. It is noted that the system allows the clinical research investigator to explore and analyze his research data personally. Because of this capability, the investigator is able to gather more information than usual. It is stated that the investigator is able to use the system without having to learn about computer technology and without having to work through intermediaries. He can: describe data interactively in his own terms; enter data values while they are simultaneously checked for validity; retrieve data by patient, variable, and time; store time-oriented patient data; create subsets of patients sharing characteristics; produce tables and graphs; and do statistical analyses. Data can also be transferred to and from other computers. It is noted that although this software is generally not available and the hardware it requires is expensive, the system is well accepted and in use at the three medical centers where it is operational. Figures highlight the data presented.

HRP-0027614/7 Not Available NTIS
Mississippi State Board of Health, Jackson.
Health Manpower Project.
Mark Lynch, Martha Irby, Mary Brantley, and Ron Sennett. 1978, 4p
Pub. in Jnl. of the Mississippi State Medical Association v19 n8 p151-154 Aug 78.

Aggregate statistics on licensed physicians in the State of Mississippi for the years 1975, 1976, and 1977 are presented. The data were collected by the Health Manpower Unit of the State Board of Health in an attempt to define the health needs of Mississippi and to alleviate the problems of statistical analysis which were manifest in previous, uncoordinated efforts. Health professionals participating in the project included: doctors of medicine, chiropractors, doctors of osteopathy, registered nurses, licensed practical nurses, nursing home administrators, optometrists, pharmacists, physical therapists, and podiatrists. A booklet of combined health statistics encompassing each of the aforementioned fields is planned. It is noted that the physicians were asked to complete an initial questionnaire. After that, the questionnaires were preprinted by computer. They contained only the information previously supplied. Physicians were asked simply to verify the information presented. Tables comparing the statistics gathered over the designated 3-year period are included.

HRP-0027615/4 Not Available NTIS
Massachusetts Univ., Amherst. Univ. Health Services.
Health Care in the Year 2000 -- A Call to Action.
Barry Averill. 1978, 3p
Presented before the American College Health Association, Fifty-sixth Annual Meeting, New Orleans, LA, 28 Mar 78.
Pub. in Jnl. of the American Coll. Health Association v27 n1 p12-14 Aug 78.

The themes of developing a national health care program, improving individual health care status, and increasing awareness of the environment on personal health are explored in relationship to college health programs. What actions can and should be taken to influence health care in the year 2000 are discussed. The role of the American College Health Association (ACHA) is explored. The ACHA is urged to concentrate and consolidate its activities in a limited number of areas in which it can expect to have an influence on future health and safety policies and procedures. Among the primary areas of focus are the development of: a strong national voice on legislation, regulation, and policy; the annual meeting and professional development seminars as major foci for continuing education activities; and essential supportive data needed to have an impact on national policy regulation and legislation. These things can be accomplished, it is noted, by supporting the move of the headquarters to Washington, D.C., by involvement in the association, and by paying membership dues.

HRP-0027618/8 Not Available NTIS
North Carolina Univ. at Chapel Hill.
Goal-Oriented Treatment Plans and Behavioral Analysis.
Beverley J. Gaines. 1978, 5p
Pub. in the American Jnl. of Occupational Therapy v32 n8 p512-516 Sep 78.

The components of the goal-oriented treatment plan are discussed and the application of the plan to occupational therapy is considered. The components of goal-oriented programs include information on the purpose of the program, a statement of the program's objective, descriptions of the treatment method, and, the procedure for gathering both baseline and progress data. Differences between goal-oriented programs and problem-oriented programs are explored. It is pointed out that the most important difference is probably the process by which treatment goals are established. While the application of detailed recording of a client's progress is most easily seen in the physical disabilities area, the system can be adapted to program requirements for patients with developmental or psychosocial dysfunctions. When the therapist systematically records the specific activity used in therapy as well as the response of the patient, objective evidence of the effectiveness of the treatment procedure is available. A data base then becomes available for research in treatment techniques. A data base may also be generated for management purposes.

HRP-0027900/0 Not Available NTIS
Satisfactory/Unsatisfactory Grading in the Evaluation of Clinical Performance in Nursing -- Its Effect on Student Motivation as Perceived by Nursing Students.
Eleanor O'Gara Gould. 1978, 10p
Pub. in Jnl. of Nursing Education v17 n8 p36-42, 45, 46, 47 Oct 78.

A study was made to determine any differences in motivation as perceived by nursing students who have been assessed by letter grading and nongrading systems in their clinical performance. The need for research was established in a literature review. Data from senior students graduating in 1975 were collected, using a questionnaire. Findings indicate that contrary to previous results, students perceive higher levels of motivation under the satisfactory/unsatisfactory system of clinical evaluation than with the letter grading system. Limitations on the study are the small sample size, the retrospective nature of students' observations, and the use of only one institution. It is recommended that schools which have, or are considering, a pass/fail grading system for evaluating practicums perform research to assure the system's effectiveness in their particular setting. A bibliography, an outline of the two scales used, two figures, and three tables are provided.

HRP-0027905/9 Not Available NTIS
Meharry Medical Coll., Nashville, TN.
Promoting Written Care Plans.
Carol Jackson, Virginia Edmundson, and Donald R. Green. 1978, 5p
Pub. in Supervisor Nurse v9 n8 p43-47 Aug 78.

A systematic approach for encouraging staff to write care plans using the Kardex record was developed at the inpatient unit of the community mental health center at the Meharry Medical College in Nashville, Tenn. After 4 weeks of baseline observations on Kardex use, each staff member was instructed in the use of the Kardex and a record of Kardex recording practices was posted in a prominent place. Verbal information was given but there was no criticism. In the baseline period, 5.9 percent of the evening and 46.3 percent of the day shifts used the Kardex; after intervention, these values increased to 78.6 and 93.2 percent respectively. To maintain consistent recording, praise and positive assistance were given on a one-to-one basis by supervisory personnel and the Kardex was reviewed every week with individual staff. Staff psychologist intervention, competition between shifts, and leadership of supervisory staff also contributed to record maintenance. Problems encountered were general resistance to the new emphasis on care plans, failure to write plans immediately after patient assignment, lack of incentive, and incomplete descriptions. The posting of the feedback sheet and weekly review were discontinued when staff had become comfortable with the system. Two figures are included.

HRP-0028244/2 Not Available NTIS
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
Accuracy of Chest Film Screening by Technologists in the New York Early Lung Cancer Detection Program.
Betty J. Flehinger, Myron R. Melamed, Robert T. Heelan, Carolyn M. McGinnis, and Muhammad B. Zaman. 1978, 5p
Pub. in American Jnl. of Roentgenology v131 n4 p593-597 Oct 78.

The feasibility of using specially trained radiology technicians to screen chest radiographs was investigated as part of an early lung cancer detection program in New York City. The early lung cancer detection program is for male volunteers over 45 years of age who smoke at least one pack of cigarettes daily. Two radiology technicians are responsible for operating the screening equipment and taking films. Screening interpretations are re-

corded according to one of three categories (normal, abnormality but probably not lung cancer, and abnormality raising sufficient suspicion of lung cancer to require thoracic surgical consultation). Two technicians were evaluated: the questions asked related to how well the technicians' interpretations matched the diagnosis of a radiologist, whether the match improved with experience in the program, what proportion of cases ultimately confirmed as lung cancer were correctly detected, and what proportion of cases requiring special studies before lung cancer could be ruled out were detected by the technician. Both technicians performed well, but there was a difference in their approach. Agreement between technicians and radiologists increased as technicians gained experience. It is concluded that specially trained radiology technicians can screen chest radiographs reliably in a cancer detection survey. Supporting data are provided.

HRP-0028274/9 Not Available NTIS
Manitoba Univ., Winnipeg.
Obstetric Care in the Central Canadian Arctic.
T. F. Baskett. 1978, 4p
Pub. in British Medical Jnl. v2 n6143 p1001-1004 7 Oct 78.

A discussion of obstetric care provided to Canadian Eskimos in remote areas of Northern Canada is provided. A study was made of pregnancies that occurred from 1971-75 among 4,000 Canadian Eskimos living in isolated settlement districts of the Northwest Territories. Settlement nursing stations, a base hospital manned by general practitioners, and a teaching hospital in Winnipeg provided obstetric care. From 1971-75, 622 infants were delivered. Of these, 338 were delivered in the base hospital, 218 were delivered in nursing stations by midwives, and 54 were delivered in the teaching hospital. The average age of patients at delivery was 26.5 years, with a range of 13 to 48 years. The birth rate and perinatal mortality rate of the Canadian Eskimos are said to be double the national average, while the infant mortality rate is said to be quadruple the national average. It is observed that the only practical way of providing primary care to isolated communities of a few hundred people is with nurse practitioners; that the social and medical expectations of Canadian Eskimos seem to be changing; that many of the younger patients request and expect hospital delivery; and that this expectation will be the main factor in influencing the obstetric services to this area.

HRP-0028278/0 Not Available NTIS
Children's Orthopedic Hospital and Medical Center, Seattle, WA. Poison Control Center.
National Organizations and Agencies in Poison Control Programs -- A Commentary.
William O. Robertson. 1978, 6p
Pub. in Clinical Toxicology v12 n3 p297-302 1978.

Awareness of the chemical environment and poison control by national organizations and agencies are described. Accidental ingestions are responsible for needless morbidity and mortality in children. Various groups and organizations are involved in poison control programs, serving as forums for individual and collective ideas. The Poison Control Center was established in 1953 by efforts of the American Academy of Pediatrics and its Accident Prevention Committee, the public sector, and the private sector in Chicago, Ill. Comparable units were implemented throughout the United States. At the suggestion of the American Public Health Association, the National Clearinghouse of Poison Control Centers became operational in 1956. The American Association of Poison Control Centers, founded in 1958, has developed guidelines for the development and operation of poison centers and has prepared educational materials and grant policies for sponsoring modest research activities. The American Academy of Clinical Toxicology, formed in the late 1960's, is concerned with the need for introducing clinical toxicology into medical school curriculums. Pharmacists and drug information centers focus on drug-drug interactions and adverse reactions to drugs. Businesses, educational institutions, and the Federal Government have roles to play in poison control programs, particularly with regard to the collection of toxicological information.

HRP-0028279/8 Not Available NTIS
National Health Insurance -- A Political Issue at the Crossroads.
Jeffrey A. Prussin. 1978, 5p
Pub. in Jnl. of Nursing Administration v8 n11 p12-16 Nov 78.

A discussion of the proposed National Health Insurance (NHI) program and political factors influencing that program is presented. It is pointed out that since President Carter assumed office, his position on NHI has become more, rather than less, flexible, and less, rather than more, specific. Top level administration officials, it is noted, have not been able to agree on the most appropriate type of NHI plan. As a result, Carter's advisers have recommended a wide variety of NHI approaches. The Carter administration's lack of rapport with Congress is cited as an additional problem involved in getting NHI legislation passed. It is pointed out that even if other barriers to NHI could be overcome, there are jurisdictional disputes within the Congress that could delay, or even preclude, NHI action. Jurisdictional disputes in the House and Senate are outlined. There appears to be no consensus in Congress regarding the fundamental principles upon which an NHI plan should be based. NHI action during the Carter administration therefore seems to be unlikely. It is pointed out that the most likely course of action may be the enactment of a mini-NHI plan. Such a plan could improve Medicare and Medicaid programs, supply catastrophic coverage, or supply coverage to mothers and children.

HRP-0028322/6 Not Available NTIS
Pennsylvania Univ., Philadelphia.
Returning Therapist -- A Group Approach.
Deborah R. Labovitz. 1978, 6p
Pub. in the American Jnl. of Occupational Therapy v32 n9 p580-585 Oct 78.

Career patterns of occupational therapists (OT's) are examined and the need for this category of health professional is addressed. Services provided by OT's have consistently expanded as the result of advances in theoretical knowledge that have enlarged the scope of occupational therapy into new areas, the expansion of health care facilities in relation to consumer demands and social welfare policies, and the broadened definition of services covered by third-party payment systems. There is a need for OT's, but increasing the number of educational programs is expensive and time-consuming. An alternative is better utilization of existing trained manpower. The majority of OT's are women; sociocultural factors influencing the participation of women in the labor force are important when estimating manpower resources. Some therapists who have left the profession do return, but in insufficient numbers to alleviate the shortage. A structured program sponsored by a professional association that integrates the reentry process while remaining sensitive to the needs of individuals as women is recommended. Two principles should guide such a structured program: (1) women interested in returning to the work force should have general preparation to reenter the labor force and specific preparation for the job they wish to assume; and (2) an approach to reactivation that includes both general and specific preparation is better than an approach that includes only one type of preparation. A case study involving reactivation is cited.

HRP-0028324/2 Not Available NTIS
Georgia Univ., Athens. School of Pharmacy.
De-Institutionalization of Mental Health Care -- An Opportunity for Clinical Pharmacy Practice.
Charles L. Braucher. 1978, 5p
Presented at the 12th Annual Midyear Clinical Meeting of the American Society of Hospital Pharmacists, Atlanta, GA, Dec 8, 1977.
Pub. in American Jnl. of Pharmacy v150 n5 p160-164 Sep-Oct 78.

Federal initiatives that have influenced the movement toward deinstitutionalization are considered, with attention given to the impact of these initiatives on the practice of clinical pharmacy. With the introduction of psychotropic drugs in the 1950's, an era of significant change commenced. The Joint Commission on Mental Illness and Health was established by Congress in 1955, followed by the Community Mental Health Centers Construction Act in 1963, subsequent mental-health-related acts and amendments, and the Community Mental Health Centers Amendments in 1975. The latter act renewed and extended the community mental health center program for an additional 2 years. Prior to the 1975 amendments, five services had to be offered by a center: outpatient, inpatient, partial hospitalization, emergency, and consultation and education services. Seven additional services were mandated by the 1975 amendments: alcohol and drug services, specialized services for children and adolescents, specialized services for the elderly, rape prevention services, screening of all people in need of psychiatric hospitalization, followup care for formerly hospitalized clients, and halfway houses. There has been a consistent trend toward deinstitutionalization as a result. The specific duties of a psychiatric pharmacist in a community mental health center are delineated.

HRP-0028330/9 Not Available NTIS
Wessex Cardio-Thoracic Centre, Southampton (England).
Wessex Cardiac Surgery Follow-Up Survey -- The Quality of Life After Operation.
J. K. Ross, A. E. Diwell, J. Marsh, J. L. Monro, and D. J. Barker. 1978, 7p
Pub. in Thorax v33 n1 p3-9 1978.

This survey was conducted to provide information about changes in patients' activities, occupations, and lifestyles before and at set intervals after open-heart surgery. Data were gathered over a period of 3 years from a series of interviews with 200 consecutive adult patients at the Wessex Cardio-Thoracic Unit in England. Each patient was interviewed with the aid of identical questionnaires at four preset intervals: after referral for surgery (conducted in the patient's own home unless the patient was an emergency case), and at 2, 8, and 20 months after leaving the hospital. When possible, relatives of patients were present during the interviews. All postoperative interviews were held in an office separated from the clinical atmosphere of the consulting room. The questionnaire elicited information on employment, physical symptoms and extent of activity, family life, hobbies and leisure, sexual relationships, and mood. Twenty months after surgery, 68 percent of the respondents indicated that there were no limitations on normal activity, compared with a preoperative figure of 12 percent, and that there had been a corresponding pattern in return to useful employment. Decreased dependence on others was reported for 73 percent of the respondents after 8 months. Favorable trends in employment, the use of leisure time, sexual relationships, and mood demonstrated an overall improvement in the quality of life for most patients. Supporting data are provided. The questionnaire is not included.

HRP-0028336/6 Not Available NTIS
Management's Rights in Labor Relations.
Norman Metzger. 1978, 4p
Pub. in Health Services Manager v11 n11 p1-4 Nov 78.

Collective bargaining in the hospital setting and the rights of management in unionization are addressed. Limitations on disciplinary powers and management's rights in general are imposed by collective bargaining agreements. Discipline is a right of management, but the discharge of an employee is dependent on certain requirements. These are: the employer must prove that alleged acts occurred and were of sufficient gravity to warrant termination; the employer must show that the conduct was not condoned and that the employee was warned; the evidence must demonstrate that the employee made no effort to heed any warning; and there must be a consistent and recurring pattern of misconduct where a long-service employee is involved. It is generally conceded by management and labor that rights not restricted by collective bargaining agreements reside in management. When hospital administrators sign an agreement with a union, they no longer have sole authority to administer the hospital. Key areas of authority covered by management's rights clauses in contracts are: manage and administer the hospital and its staff; hire, discipline, and transfer personnel; introduce improved methods and facilities; formulate rules of conduct; establish quality standards; discontinue jobs; determine employee qualifications; and subcontract work. The issue of seniority is im-

portant in collective bargaining agreements. Occupational seniority where separate units are set up for employees performing the same type of job, is more practical for a hospital than departmental seniority.

HRP-0028345/7 Not Available NTIS
Commonwealth Fund, New York.
Generations of 'Health Planning' by Government.
Walter Donway. 1978, 4p
Pub. in Private Practice n10 p35ff Oct 78.

Legislative and funding aspects of health planning and governmental involvement in the control of hospital facilities, services, and equipment are addressed. There are various descriptions of a successful system of medical care: mobilizing health care resources, integrating the total pattern of health services, equal health services for all persons, one-class medical care, pluralistic social responsibility, a balanced system of health services with emphasis on the environment and health needs of all citizens, and comprehensive services for all. Under the National Health Planning and Resources Development Act of 1974, an attempt is made to remedy problems resulting from previous Government intervention through health systems agencies (HSA's) and other provisions. The HSA system requires the development of State health plans in accordance with DHEW guidelines. The Government's encouragement of hospital facility construction and the promotion of hospital-based care has resulted in an oversupply of hospital facilities. It has, in many cases, inhibited competitors and adjustments that are automatic in the free market. The effectiveness of the certificate-of-need approach is questioned.

HRP-0028346/5 Not Available NTIS
Claremont Graduate School, CA.
Future Shape of Health Care.
Peter F. Drucker. 1978, 2p
Pub. in Connecticut Medicine v42 n10 p663-664 Oct 78.

Consumers' satisfaction with the U.S. health care system and the future of that system are discussed. In most surveys, it has been found that most people are well satisfied or highly satisfied with the health care system. Most persons are enrolled in employment-based plans, with the remainder on Medicare or Medicaid. Health care in the 1980's will be different in terms of the coverage of health care costs, the pluralism of health care providers, and the organized control and self-control of medical standards and health care costs. More people will have catastrophic illness insurance and there may be a great deal of emphasis on a high deductible and on some coinsurance feature up to a certain amount or percentage of an insured family's income. The mechanism for the extension of coverage will be contracts between individual employers and their employees rather than law. Health care will be delivered by three competing modes: private physicians, individual physicians' associations, and health maintenance organizations. Peer review by physicians in hospitals will increase due to malpractice suits and Government pressure. Systematic review of hospital costs by Blue Cross and other insurers will also grow, as will review by employers and large unions. The conclusion is that there is really no grassroots pressure for more than minor changes to the health care system.

HRP-0028350/7 Not Available NTIS
Saint Louis Park Medical Center, Minneapolis, MN.
Quality Assurance in the Ambulatory Setting -- An Operating Program.
Paul B. Batalden, Marion P. McClain, J. Paul O'Connor, and A. Stuart Hanson. 1978, 13p
Pub. in the Jnl. of Ambulatory Care Management v1 n4 p1-13 Nov 78.

An overview of the quality assurance program for the ambulatory care setting at the St. Louis Park Medical Center in Minneapolis, Minn., is presented. The center is a multispecialty group practice with more than 100 physicians in 16 clinical departments and 5 satellite facilities. Effective quality assurance efforts lead to modified behavior (change in performance). In order to improve the quality of ambulatory care in a systematic manner, it must be possible to promote behavior change among providers and/or consumers and to do so at a reasonable cost. Underlying the rationale for the ambulatory care quality assurance program at the center is the idea that the physicians can be encouraged to look critically at their provision of care and can improve such care as needed. The quality assurance program addresses three questions: what can be done better, what is usually or not usually done in practice, and what patients expect from physicians. The elements of the program include problemsolving meetings, a monitoring system to identify the status of each problem, and staff sessions. It is the premise of the program that less-than-optimum care is the result of performance gaps rather than knowledge gaps. Illustrations of the program and the problemsolving process are provided and the costs of the quality assurance approach are discussed.

HRP-0028351/5 Not Available NTIS
New Haven Univ., CT. Coll. of Business.
Physician Extenders in Rural Ambulatory Care Clinics.
Gene F. Brady. 1978, 10p
Pub. in the Jnl. of Ambulatory care Management v1 n4 p63-72 Nov 78.

The responsibilities of physician extenders in the provision of ambulatory care to residents of rural areas are discussed. Physician extenders are persons with training and responsibilities for complementing or supplementing the functions of physicians. Emphasis is placed, however, on persons who are geographically detached from supervising physicians in rural or remote communities, including the MEDEX form of physician's assistant and family nurse practitioners. Studies of the use of physician extenders are generally task allocation studies performed by operation researchers, system analysts, management scientists, and economists or studies performed by physicians and nurses on the training and performance of physician extenders and their comparability with physicians. Two levels of autonomy among physician extenders are the level of autonomy that a particular occupational group enjoys as a result of the traditional and legal extension of delegation boundaries and the level of performance autonomy. Factors involved in the responsibilities of physician extenders in rural practice concern professional isolation (patients' dependence, adequate access to resources, and the role of supervising physicians), skill level and position tenure (training, professional aspiration, and lack of educational opportunities), and ambulatory care management (delegation practices, balancing costs and benefits, work dissatisfaction, and critical job factors in the self-fulfillment of physician extenders in remote locations).

HRP-0028352/3 Not Available NTIS
California Univ., Los Angeles.
National Health Policy Formulation in Socialist Poland.
Milton I. Roemer. 1978, 8p
Pub. in Jnl. of Health Politics, Policy and Law v3 n2 p155-162 Summer 1978.

The development of the health care system and the health planning process in Poland are described. After World War II, the decision was made by the United Workers Party to develop a unified health care system. All health care services and resources were placed under one central ministry. Unified administration applies to the delivery of personal health services, environmental health services, the distribution of drugs through public pharmacies, and the training of physicians and other health care personnel. Physical resources for the delivery of health care are national networks of ambulatory care centers and hospitals, staffed entirely by salaried medical and allied personnel. Entry into the health care system for preventive or treatment services is through a primary care center at the neighborhood level. Although all health workers in the unified health care system are public employees, private medical or dental practice is not prohibited. Special priority is given to children and to industrial workers. The health care system has emerged through centralized planning, with decisions on health planning goals and financial expenditures being political. Basic policy decisions in the health planning process relate to the availability of health services without charge, health care administration, Provincial implementation of health policy, the integration of preventive and treatment services, and quality assurance through close linkages between educational institutions and health services. The implications of Poland's system for the United States are examined.

HRP-0028354/9 Not Available NTIS
Rhoose Farm House, Glamorgan (Wales).
Health Service 'Input' and Mortality 'Output' in Developed Countries.
A. L. Cochrane, A. S. Leger, and F. Moore. 1978, 6p
Pub. in Jnl. of Epidemiology and Community Health v32 n9 p200-205 Sep 78.

Indices of health facilities and certain environmental and dietary factors in 18 developed countries were examined and their relationship to mortality rates was assessed. Four criteria were employed in the selection of 18 developing countries for study: (1) a gross national product exceeding $2,000 per capita, except for the Republic of Ireland; (2) a population of more than 2 million; (3) data available for 1970 (but if not, data for 1969 or 1971 accepted); and (4) countries excluded where genetic factors may account for a substantial proportion of the difference between their mortality and that of other countries. Input variables included health care indices, dietary consumption, and other demographic or economic variables. Output was measured by age-specific mortality rates up to the age of 64 years. The correlation between the prevalence of physicians and pediatricians was large. There was also a correlation between alcohol and cigarette consumption and mortality. A negative association existed between the prevalence of nurses and maternal, perinatal, infant, and early childhood mortality. The availability of acute hospital beds exhibited a variable association with mortality rates. Dietary factors had consistently positive associations with mortality. Sugar consumption was negatively related to maternal mortality and mortality in younger age groups. Gross national product was negatively associated with mortality. Supporting data are provided.

HRP-0028355/6 Not Available NTIS
Health Systems Agencies (HSA's) vs. Doctors -- The War Is On.
Steven B. Enright. 1978, 9p
Pub. in Medical Economics v55 n10 p102, 104-111 30 Oct 78.

The impact of health systems agencies (HSA's) on the practice of medicine by physicians is explored. The efforts of physicians in certain States indicate that the medical community is influential in deciding how much impact HSA's will have. HSA's in some areas, on the other hand, have gone unchecked due to a lack of interest among local physicians. Recommendations are made by HSA's as required by law for all certificate-of-need applications to build and expand facilities. HSA's approve or disapprove proposed uses of Federal funds in fields such as mental health, alcoholism, and drug abuse. They are required to review the appropriateness of existing institutional services, to recommend projects for modernization and construction, and to develop long-range health systems plans. Both consumers and health care providers are supposed to be represented on HSA governing boards. The experience of HSA's and their relationship with physicians in Connecticut, Virginia, Maine, New York, Ohio, Massachusetts, and Oklahoma is detailed.

HRP-0028581/7 Not Available NTIS
Maimonides Community Mental Health Center, Brooklyn, NY.
Possible Programmatic Consequences of Community Mental Health Center Funding Arrangements -- Illustrations Based on Inpatient Utilization Data.
Gerald Landsberg, and Roni Hammer. 1977, 5p
Pub. in Community Mental Health Jnl. v13 n1 p63-67 1977.

A discussion is provided of the impact of the payment and fiscal reimbursement policies of private insurers, Government health insurance programs, and Blue Cross on the mental health inpatient unit. General funding arrangements are outlined. The failure of community health legislation which provided Federal funding for up to 8 years is ex-

plained. In July 1975, remedies to these failures were suggested, including fiscal distress grants and consultation and education grants, but the fiscal problems were still not solved because of built-in time and dollar limitations. In addition, the centers remain dependent on the third-party reimbursement system; the general and specific features which affect the delivery of psychiatric services are noted. The inpatient unit of the community mental health center generates two-thirds or more of the center's fee income. The results of a study on mental health center inpatient utilization patterns are presented. It is predicted that inpatient services will be increasingly emphasized so that fiscal pressures can be met. Other programs such as day hospitals, day care, sheltered living, and halfway houses will be deemphasized. It is suggested that community health centers will become revolving doors for a recidivist population.

HRP-0028596/5 Not Available NTIS
Indiana Univ. Hospitals, Indianapolis. James Whitcomb Riley Hospital for Children.
Parent Care Pavilion.
Morris Green, and Janice G. Green. 1977, 5p
Pub. in Children Today v6 n5 p5-8, 36 Sep-Oct 77.

An examination is provided of the development and operation of the Parent Care Pavilion, which opened in 1971 at the Riley Hospital for Children in Indiana. The pavilion has 12 parent care rooms, each with a bed for the child, single or twin beds for the parent or parents, and a bath and shower. The staffing arrangements in the pavilion are outlined. The types of problems for which children are generally admitted to the pavilion are delineated. These include: birth defects, malignancies, blood disorders, and sensory disorders. In the parent care unit, only oral medications are given. Mothers are taught how to measure medications and to follow the child's treatment schedule. The primary benefit of the pavilion is that the psychological trauma of hospitalization has been eliminated. The parent care room provides the child with a homelike sanctuary where he/she can feel secure. Children eat better and sleep better in parent care rooms than they do in traditional care units. The arrangement also allows the parent to gain a better understanding of the child's medical problem. Reduction of hospital costs is another benefit. Examples are provided and suggestions for other hospitals are supplied.

HRP-0028637/7 Not Available NTIS
Mendota Mental Health Inst., Madison, WI.
Community Approach to the Chronically Disabled Patient.
Mary Ann Test, and Leonard I. Stein. 1977, 9p
Pub. in Social Policy v8 n1 p8-16 May-Jun 77.

The development of the Training in Community Living Program of the Mendota Mental Health Institute in Madison, Wis., is discussed. The program was intended to provide chronically disabled patients with an alternative to the mental hospital and to serve as a model of care that would improve the quality of life of these patients within the community. Patients treated under the Training in Community Living Program approach were compared with a control group which received traditional short-term, in-hospital treatment in addition to community aftercare. A description of the study subjects is provided. All patients were assessed on a variety of instruments when admitted to the program and again after 4-month, 8-month and 12-month intervals. The Training in Community Living Program approach was more effective clinically that the traditional approach. The experimental approach eliminates hospitalization, teaches patients the skills required to live in the community, keeps patients involved in treatment, and assures continuity of care. In addition, patients were not improved at the expense of their families. The approach is also economically feasible.

HRP-0028863/9 Not Available NTIS
North Carolina Univ. at Chapel Hill. Dental Research Center.
Pain Profile -- A Computerized System for Assessment of Chronic Pain.
Gary H. Duncan, John M. Gregg, and Jawahar N. Ghia. 1978, 10p
Pub. in Pain v5 n3 p275-284 1978.

A description is provided of a computer-based system which was developed at the University of North Carolina Pain Clinic to evaluate and quantify three components of the chronic pain experience. Those components are: (1) the degree of physical organic disease; (2) the psychosocial impairment level; and (3) the severity of the pain behavior. For each patient, the system generates a Pain Profile and classification based on a comparison of the three aspects of chronic pain. Patients are categorized from 1 to 10, depending on the severity ranking of the components. The pathophysiologic, psychological, and behavioral aspects of chronic pain are compared mathematically. By utilizing the evaluation generated by the computer, the researcher is able to better analyze the relative importance of the chronic pain components. The clinician is aided in determining the appropriate emphasis of therapy. The Pain Profile has been found to be a useful teaching model. It may eventually direct primary care clinicians toward a more thorough evaluation of patients' chronic pain. Referral to distant 'pain centers' could thus be avoided. Figures highlight the information presented.

HRP-0028866/2 Not Available NTIS
Texas Univ. Health Science Center at San Antonio. School of Nursing.
Preparing for Accreditation.
Patty L. Hawken, and Suellen B. Reed. 1978, 5p
Pub. in Nursing Outlook v26 n12 p761-765 Dec 78.

Methods that may be utilized by a school which is preparing for the accreditation process are outlined. The methods used should provide the faculty and administration with insight into their program and allow them to identify problems inherent in the program. Once the problems are identified, steps may be taken to bring about improvements. The steps in the accreditation procedure are discussed and the role of the Council of Baccalaureate and Higher Degree Programs in the process is examined. The experience of the University of Texas School of Nursing in preparing for accreditation is recounted. The advantages of preparing early for accreditation are noted. The establishment of a steering committee to monitor the self-evaluation process is described. The processes by which the students were informed are delineated. A description of the accreditation visit is provided. A figure shows a suggested time schedule for preparation for an accreditation visit.

HRP-0028876/1 Not Available NTIS
Providence Hospital, Cincinnati, OH.
Team Leader Concept Implemented in the Operating Room (OR).
Barbara J. Craig. 1978, 4p
Pub. in the Association of Operating Room Nurses Jnl. v28 n4 p726, 728, 730, 732 Oct 78.

A discussion is provided of the development of the team leader concept in the operating room (OR) of Providence Hospital in Cincinnati, Ohio. After the concept was implemented, personnel were allowed greater freedom and flexibility. In addition, the team leader concept permitted closer supervision of personnel. The major areas in which communications improved -- internal communications within the OR department, overall hospital communication, and communication with the staff on other units -- are discussed. The OR team leader communicates directly with the team leader of other units, eliminating the involvement of another individual -- usually a clinical nursing coordinator -- and saving time. To ensure that all registered nurses and technicians can become proficient in surgical specialties, they are assigned to each team permanently. The teams then rotate through each section on a 3-week basis. The functions and responsibilities of the team leader are examined. Figures illustrate the original organization and the team leader concept of organization.

HRP-0028910/8 Not Available NTIS
Alberta Univ., Edmonton. Faculty of Nursing.
Failure to Thrive.
Jeanette Funke-Furber, and Cheryl Roemer. 1978, 5p
Pub. in Canadian Nurse v74 n11 p30-34 Dec 78.

Criteria for assessing mother-child relationships and the prevention of growth and developmental problems from birth are examined. Weight gain is the only universal criterion used to evaluate a child's failure to thrive (FTT). From the point of contact between nurses and mothers and their infants, consideration should be given to weight gain as well as to psychosocial factors and possible family disturbances. Organic problems may be associated, but the etiology of FTT involves a complex interaction among physical, nutritional, and psychosocial factors. Factors relevant to maternal and family characteristics, such as pregnancy that was both unplanned and unwanted, mothers with at least three children in rapid succession where the youngest was the FTT child, and mothers of FTT children having poor experiences with their own mothers, are discussed. One study demonstrated that most mothers of FTT infants exhibited behavior indicative of character disorder, such as concrete thinking, with poor ability to think abstractly or to develop long-term plans. Followup studies of FTT children are lacking. Some studies have been conducted, however, showing that: FTT children may have problems in personality structure and intelligence; family members require the intervention of nurses and the support of significant others; and secondary prevention should be instituted, promoting positive behavior by parents and preventing physiological symptoms in children. Data on infant behaviors frequently associated with FTT are provided, and a mother-infant interaction assessment guide is presented.

HRP-0029004/9 Not Available NTIS
Harvard School of Public Health, Boston, MA. Dept. of Behavioral Sciences.
Studies of Process-Outcome Correlations in Medical Care Evaluations -- A Critique.
William E. McAuliffe. 1978, 24p
Pub. in Medical Care v16 n11 p907-930 Nov 78.

In evaluating the quality of medical care, two methods have traditionally been used: evaluating the process of the care and evaluating the outcome of the care. Until recently, process evaluation has been the most popular. However, based on studies which challenged the validity of process evaluation, the Health Maintenance Act of 1973 mandated that outcome assessment be the method used. In reviewing the five studies upon which the act's mandate is based, this article concludes that there is little evidence to support the conclusion that process audits are generally invalid. Each study had flaws that could have accounted for its results. The most common problems were (1) inadequate statistical controls, (2) improper handling of diagnostic criteria, and (3) insufficient variation in the variables. The studies reviewed were based on audits. They had designs more appropriate for descriptive purposes or for evaluating effectiveness than for evaluating validity. Five tables and two figures summarize the results of the earlier studies.

HRP-0029016/3 Not Available NTIS
Center for Disease Control, Atlanta, GA.
Certification of Medical and Public Health Laboratory Personnel by Professional Organizations.
M. M. Brooke. 1978, 6p
Presented at the 105th Annual Meeting of the American Public Health Association, Washington, DC, Oct 31, 1977.
Pub. in Health Laboratory Science v15 n4 p221-226 Oct 78.

Since 1928, 22 professional agencies have established certification procedures for 52 categories of health laboratory personnel. About 55 percent of all such personnel are now certified by one agency or another. The certifying agencies have different criteria, however. Most require a certain level of education and experience and the passing of one or more formal examinations. The Federal and State governments do not recognize any certification by any of the agencies. Instead Medicare and the Clinical Laboratory Improvement Act of 1967 have their own requirements, even though those requirements are substantially identical with those for medical technologists certified by the American Society of Clinical Pathologists. Most States require candidates to pass State-prepared or State-approved examinations, implying that they do not believe that certification alone is adequate.

HRP-0029017/1 Not Available NTIS
Minnesota Univ., Minneapolis, Medical School.
Cessation of Cigarette Smoking and Pulmonary Disease.
Richard V. Ebert. 1978, 3p

Pub. in Jnl. of the American Medical Association v240 n20 p2159-2161 10 Nov 78.

A new strategy for dealing with the problem of smoking has been suggested by recent studies that demonstrate that the risk of developing lung cancer and chronic obstructive lung disease falls significantly with cessation of smoking. The death rate from lung cancer has been shown to be correlated to the rate of smoking. If a person stops smoking cigarettes before 20 to 25 years of indulging in the habit, his risk of lung cancer developing later in life is drastically reduced. , Therefore, physicians should focus particular attention on patients over 40 years of age and attempt to induce them to abstain from smoking because of the risk they run of developing lung cancer and other diseases, including coronary artery disease. Assistance to patients attempting to break their habit can be of several types: group therapy, aversive techniques, and the use of nicotine chewing gum. The effect of modification of the tar content of cigarette smoke on the incidence of pulmonary disease may not be known for many years. In view of the lack of evidence that a decrease in tar level alters the incidence of chronic bronchitis and emphysema, physicians should urge patients, especially those over 40, to abstain from cigarettes altogether.

HRP-0029053/6 Not Available NTIS
American Federation of Labor and Congress of Industrial Organizations, Pittsburgh, PA.
Labor Perspective.
Bernard Greenberg. 1977, 8p
Presented at the 1976 Annual Health Conference of the New York Academy of Medicine, held April 22-23, 1976.
Pub. in Bulletin of the New York Academy of Medicine v53 n1 p29-36 Jan-Feb 77.

This article contends that pressures for the reform of the U.S. health care delivery system can no longer be ignored. Certain medical problems (e.g., the cost and availability of care and the building, financing, and administration of hospitals, research centers, and medical education institutions) must be among the concerns of government. At present, provision of primary care is inadequate or absent in large parts of the nation. In the absence of other means of initial access to medical care, millions of Americans enter the system through hospital outpatient departments. Not only is this expensive, but it is also inefficient and ineffective. The free market mechanism neither organizes nor delivers medical care adequately. Therefore, two things are needed: (1) central authority to plan and execute plans, and (2) a change in the present method of financing and paying for medical care. Future plans must recognize the need for new forms of facilities and for new kinds of professionals, paraprofessionals, and technicians. Private insurance and private payments can never generate nor support a true system of controls and accountability. These are only possible through law and government. Salary, per diem, or per capita remuneration of physicians is needed, especially in areas including industrial medicine, school medicine, and emergency care.

HRP-0029078/3 Not Available NTIS
Bowling Green State Univ., OH. Dept. of Sociology.
Research Needed on Socioeconomic Differentials in U.S. Mortality.
Edward G. Stockwell, Jerry W. Wicks, and Donald J. Adamchak. 1978, 7p
Pub. in Public Health Reports v93 n6 p666-672 Nov-Dec 78.

The relationships between socioeconomic status and two types of mortality -- mortality in general and infant mortality -- are discussed. The two basic kinds of study are those in which data are collected on individuals, and those based on data for ecological units, e.g., census tracts. Contrary to earlier optimistic speculations, census tract studies indicate that the socioeconomic mortality differential has changed little, if any, since the 1950's. However, the precise nature of this differential is still inadequately understood. It is known that a low socioeconomic status is associated with a higher than average death rate, but there is still considerable variation from one area to another, from one population subgroup to another, and from one measure of socioeconomic status to another. What is more important, there has been little progress in explaining what it is about low socioeconomic status that results in the higher death rates. Infant mortality rates have long been recognized as an extremely sensitive index of socioeconomic differences. A Bowling Green State University study demonstrated that this relationship was even more pronounced in 1970 than 1950. Extensive study is needed to explain the relative effect of specific factors responsible for higher infant death rates among lower socioeconomic groups. Four statistical tables are included.

HRP-0029633/5 Not Available NTIS
Postoperative Assessment -- The Key to Avoiding the Most Common Nursing Mistakes.
Theresa M. Croushore. 1979, 4p
Pub. in Nursing79 v9 n4 p47-50 Apr 79.

Mistakes to avoid in the provision of postoperative assessment and care by nurses are examined. Nurses who do not perform scheduled and systematic assessments of patients after surgery tend: to underestimate the importance of even small changes, underestimate the value of their own judgments, and communicate inadequately with physicians and other nurses. Four particular mistakes often made in postoperative assessment are cited: (1) making the assumption that elective surgery patients never have problems; (2) ignoring 'insignificant' symptoms; (3) delegating certain functions that could be performed by nurses to physicians, such as functions pertaining to circulation, respiration, neurological status, the wound, the genitourinary tract, and the gastrointestinal tract; and (4) relying too much on physicians (i.e., nurses call for the assistance of physicians before they have actually assessed the patient's status). Tabular information on expected wound drainage after abdominal surgery and on expected drainage from tubes and catheters is provided. Common postoperative complications are also listed.

HRP-0029665/7 Not Available NTIS
Utah Univ., Salt Lake City. Coll. of Nursing.
Biomedical Instrumentation and the Nurse Practitioner.
Sue E. Huether. 1978, 11p
Pub. in Nursing Clinics of North America v13 n4 p561-571 Dec 78.

The incorporation of instrumentation technology into the practice of nursing is explored. Since the 1960's, there has been a significant change in the role of nurses due to the increased utilization of instruments, especially in critical care units and emergency rooms. These instruments are used to measure biological or physiological parameters and to provide clinical information that helps practitioners plan, evaluate, or revise treatment. The components of all instrument systems are basically a transducer, a signal processor or conditioner, and a display or readout device. A system of circuits links each component with the other. In biotelemetry, physiological variables about a patient are sensed and transmitted over a distance to a receiver. Radio telemetry uses components that are similar to those for general bioinstrumentation systems; it is most effective for short and intermediate distances, depending on environmental conditions. The expansion of technology in instrumentation has affected the role of nurse practitioners. This impact is related to differences in practice settings, client encounters, accountability, reimbursement, and the use of biomedical instrumentation. The use of electronic instruments by nurse practitioners for data collection and for treatment is examined in depth.

HRP-0030030/1 Not Available NTIS
International Health.
Paul F. Basch. 1978, 380p
Available from Oxford University Press, Inc., 200 Madison Ave., New York, NY 10016.

The purpose of this book is to provide a broad base for understanding the international situation concerning health and to form a coherent pattern out of the diverse elements involved. To accomplish this goal, topics providing a general background and specific issues of current interest have been selected for discussion. An attempt has been made to present a variety of perspectives and approaches when dealing with controversial issues. The opening material explores the relationships between geographic location and health and the nature of interactions between humans and the environment. In the discussions that follow, historical trends having an effect on the current state of human health, relationships between development and health, culture, information (i.e., types of health-related data, population data, vital statistics, and related concerns), health policy and strategy, and medicine are discussed. The latter discussion covers such areas as users and their relationship to the medical care system and to providers in the system. The final chapter, on the community, encompasses such concerns as international travelers, organizations working abroad, and the professional international health worker. Tables and figures accompany the text.

HRP-0030032/7 Not Available NTIS
Evolution of a Public Health Nursing Performance Evaluation Tool.
Jane Engle, and Violet Barkauskas. 1979, 9p
Pub. in the Jnl. of Nursing Administration v9 n4 p8-16 Apr 79.

The performance evaluation tool (PET) was devised to assess the quality of nursing care given by public health nurses to individual patients and their families. An additional reason for its development was the need of the Chicago Department of Health Nursing Division to articulate the philosophy and concepts of nursing and public health. Three components were involved in the evolution of the PET: development; inservice education; and testing. Staff nurses played a role in developing the tool by defining quality and the way it should be measured. Inservice education was provided to nurses with regard to content areas on which they would be evaluated. The tool was subsequently tested for validity and consistency and for interrater reliability. After reviewing the literature concerned with evaluation instruments and methods, the task of delineating the scope of the PET was faced. Standards and criteria had to be selected, and unique components that differentiate public health nursing from hospital nursing had to be considered. The PET met content validity standards, and internal consistency reliability for part of the PET was good. Interrater reliability and the range of supervisor scores were unacceptable, and supervisors tended to rate more favorably than controls. Despite problems in public health nursing performance evaluation, the PET was viewed by staff nurses as a steppingstone for professional growth. A sample portion of the PET is included.

HRP-0030033/5 Not Available NTIS
Yale-New Haven Medical Center, Inc., CT.
From Staff Nurse to Head Nurse -- A Trying Transition.
Susan L. Dooley, and Jane Hauben. 1979, 4p
Pub. in the Jnl. of Nursing Administration v9 n4 p4-7 Apr 79.

The process of transition from staff nurse to head nurse at the Yale-New Haven Hospital in Connecticut is detailed. The hospital has three inpatient acute psychiatric care units. There was an adjustment and maturation process for staff nurses who assumed the position of head nurse on these units. The process involved three stages: (1) idealism and ego gratification; (2) role confusion; and (3) role identification and definition. During the first two stages, head nurses often moved too quickly to effect changes, for which they might receive recognition, and came to realize that ego and idealism alone are not essential characteristics of a good head nurse and manager. An increased understanding of problems on the units and a growing trust of supervisors emerged in the third stage. Head nurses began to cooperate with other members of the health care team. As the expectations of head nurses were clearly delineated, subordinates responded to them more positively. This, in turn, resulted in better patient care. Additional advantages of role identification and definition were the ability to maintain activities and effect changes on the units, seeing ideas work, seeing staff positively motivated, being more objective and self-sufficient, and the ability to seek alternative sources of stimulation and gratification.

HRP-0030036/8 Not Available NTIS
Nursing Shortage -- Yes.
Letitia Cunningham. 1979, 12p

Pub. in the American Jnl. of Nursing v79 n3 p469-480 Mar 79.

The question of whether a nursing shortage exists is addressed. A research project was initiated by two educators at the University of Michigan covering an 18-month period ending in January 1979 with the circulation of an overview of newspaper articles dealing with the nursing shortage. Newspapers revealed several problem areas, e.g., a geographic maldistribution of nurses and the need for registered nurses with additional education, due to expanding health care operations. A national spot survey was conducted in response to the overview of newspaper articles by the American Journal of Nursing to determine the extent of the nursing shortage and its effect on health care. Interview data revealed: there is a severe nursing shortage in many areas of the country; most States have a serious maldistribution of registered nurses even without a numerical shortage; and the shortage is most acute in hospitals. Also, there is a growing need for qualified public health nurses, as well as a lack of registered nurses with advanced preparation; and the severe shortage of teaching staff will have an adverse effect on the quality and quantity of registered nurses. Representatives of only two States (Delaware and Rhode Island) reported adequacy of registered nurses. The need for more nurses is considered in relation to health maintenance organizations, changing concepts of health care, economics, long-term care, the advancement of medical knowledge and technology, growth of the nurse practitioner movement, salaries, education, and the recognition of nurses as professionals in their own right.

HRP-0030037/6 Not Available NTIS
Columbia Univ., New York. Dept. of Health Planning and Design.
Nursing Station Design Using a Social Theory Model.
J. Richard Goldstein. 1979, 5p
Pub. in the Jnl. of Nursing Administration v9 n4 p21-25 Apr 79.

The purpose of this discussion is to help the nurse administrator responsible for communicating the design requirements of the nursing station to the architect. Functional and social requirements of nursing stations vary according to hospital and hospital unit. Interaction at these stations involves adaptation behavior, job performance behavior, interpersonal behavior, and personal behavior. Design considerations pertain to the staffing of reception areas, the positioning of guards at the entry location of nursing stations, the need for a clear view of all patient doors and building corridors, the placement of physiological monitoring and other equipment, the importance of having no obstructions on writing surfaces, the appropriate location for laboratory specimens and food trays, and storage space. Clerk activities at nursing stations must be incorporated in the design process, as must the needs of student nurses, patients, and visitors. The concept of a decentralized nursing station, where nurses theoretically spend more time in direct patient care, is discussed. Bibliographical references are included.

HRP-0030041/8 Not Available NTIS
Self-Care.
Catherine M. Norris. 1979, 4p
Pub. in American Jnl. of Nursing v79 n3 p486-489 Mar 79.

The trend toward more societal awareness of health care requirements and the amenability of many preventive, diagnostic, and therapeutic practices to self-care are discussed. A consumer movement, self-care essentially involves control, responsibility, freedom, expanded options, and an improved quality of life. Contributing factors are dissatisfaction with medical care, prohibitive costs, and changing views of health and illness. In contrast to patient education, self-care is broader in scope and extends to the total environment. Self-care encompasses monitoring, assessing, and diagnosing; supporting life processes; therapeutic and corrective self-care; prevention of disease and maladjustment states; specifying health needs and care requirements; auditing and controlling the treatment program; and grass roots or self-initiated health care. Nursing has an important role in self-care, particularly with regard to concepts of disease prevention, health promotion, and information; supporting the inclusion of health care workers who have previously functioned on the periphery of the health care system; providing direct access to patients and greater accountability for care through the nurse practitioner movement; and establishing departments of health education in educational institutions.

HRP-0030072/3 Not Available NTIS
Ontario Economic Council, Toronto.
Measuring Health – Lessons for Ontario.
A. J. Culyer. 1978, 78p
Available from Univ. of Toronto Press, 33 E. Tupper St., Buffalo, NY 14208.

The purpose of this book is to offer a guide to health measurement literature and to relate it to existing and prospective policy choices in Ontario, Canada, as well as to the Federal context of health indicator development. To accomplish this goal, social indicators and indices are applied to existing statistics in the Province in a county-by-county survey of its health care. Information needed but not available for health assessment is identified. The book seeks to identify the information required for operating an efficient and humane health system in the Province and to examine the problems associated with interpreting, operationalizing, and using the information. The information needed relates to the health status of the Province's citizens. Recommendations for Ontario policy are included. Particular attention is given to areas in which health status measures might be most productively developed and used and to ways in which the difficulties identified could be dealt with. Twenty-three tables and a bibliography accompany the text.

HRP-0030073/1 Not Available NTIS
Understanding Hospital Financial Management.
Allen G. Herkimer. 1978, 346p
Available from Aspen Systems Corp., 20010 Century Blvd., Germantown, MD 20767.

This book seeks to make the hospital department manager, supervisors, and other nonaccountant health care professionals aware of the basic techniques of health care management. Other goals are to stimulate readers' interest in health care financial management, encourage them to pursue higher education in the field, and motivate them to implement the management techniques outlined. The book's premise is that health care costs can only be controlled if the institution's department managers and supervisors know the origins of costs and the ways that they change under various conditions. The material covers the evolution and fundamental principles of health care financial management, cost characteristics and their related behavior, financial planning and control, performance evaluation and production units, volume forecasting, the budgetary control process, and cost finding and payment methods. Revenue, wage and salary, and nonwage and salary budgeting are also considered. Finally capital expenditure planning is explored. The summary identifies several trends (new services, patient and nonpatient shared services, contract services, and cost awareness) that should be watched. The appendixes deal with the Workload Recording Method and laboratory cost distribution statistics.

HRP-0030077/2 Not Available NTIS
Michigan Univ., Ann Arbor. School of Nursing.
Group Process for Nurses.
Maxine E. Loomis. 1979, 170p
Available from C. V. Mosby Co., 11830 Westline Industrial Dr., St. Louis, MO 63141.

Assessment, intervention, and evaluation tools are provided to help nurses in using small groups to meet clients' biopsychosocial health care needs. The opening discussion deals with small group objectives. In addition to presenting these objectives, the discussion touches on: the benefits and disadvantages of groups as vehicles for the delivery of psychosocial health care; group structure, process, and outcomes; and a schema for categorizing types of therapeutic groups. Subsequent material deals with guidelines for: developing and structuring group experiences to help restore, maintain, or improve clients' psychosocial functioning; leadership roles; integration of members; and the use of curative factors after the group is in progress. Particular attention is given to development of group cohesiveness and termination. In the final section, small group outcomes are discussed in terms of maintenance, learning, and behavior change outcomes that can result. Measures for evaluating client outcomes and therapeutic effectiveness are outlined, as are ideas for future research.

HRP-0030099/6 Not Available NTIS
National Center for Health Statistics, Hyattsville, MD.
Current Burden of Illness in the United States.
Dorothy P. Rice, Jacob J. Feldman, and Kerr L. White. 1978, 36p
Presented at the annual meeting of the Institute of Medicine, Oct 27, 1976, Washington, DC.
Available from University Microfilms International, 300 N. Zeeb Road, Ann Arbor, MI 48106.

The subjects of this paper are the effects of illness in the United States and the Federal role in easing the illness burden. The effects of illness are examined by disease categories in terms of years of potential life lost, demands on medical care resources resulting from hospital inpatient utilization, sickness-benefit payments and disability allowances, and limitations of working and participating in other normal activities. The dollar value of direct and indirect economic costs are also considered. The indices of burden developed are presented in 16 diagnostic groups: infective and parasitic diseases; neoplasms; endocrine, nutritional and metabolic diseases; diseases of the blood and blood-forming organs; mental disorders; diseases of the nervous system and sense organs; diseases of the circulatory system; diseases of the respiratory system; diseases of the digestive system; diseases of the genitourinary system, pregnancy, childbirth, and the puerperium; diseases of the skin and subcutaneous tissue; diseases of the musculoskeletal system and connective tissue; congenital anomalies; accidents, poisonings and violence; and other. Comparisons are made with data for England and Wales with a view towards exploring the determinants of a given disease in a given society. Consideration is given to the use of such data for allocation of resource funds.

HRP-0030100/2 Not Available NTIS
Medical Care in the United States.
Eric F. Oatman. 1978, 208p
Reference Shelf, Vol. 50, No. 1.
Available from H. W. Wilson Company, 950 University Ave., Bronx, NY 10452.

The essays in this compilation explore U.S. medical care in terms of the major issues involved and responses to the questions raised about this care. The issues discussed concern quality, the anatomy of medical care costs (physicians' fees, the costs of drugs, medical supplies, and equipment, and the cost of technology), the way in which financing methods can create their own problems, with attention given to such subjects as Medicare and Medicaid and the uninsured, availability (e.g., strategies used by rural communities to lure physicians and the surplus of physicians as a solution of maldistribution problems), and the concept of medical care as a right. The responses dealt with include proposals related to national health insurance and health maintenance organizations. The relevance of Britain's National Health Service and of Sweden's system to the United States are also considered. Each group of articles is accompanied by an editor's introduction. A bibliography is included.

HRP-0030136/6 Not Available NTIS
Metropolitan Medical Center, Minneapolis, MN.
Nutrition Attitude Instrument for Nursing Students.
Lavon A. Loh, and Betty Ruth Carruth. 1979, 6p
Pub. in the Jnl. of the American Dietetic Association v74 n2 p140-145 Feb 79.

Lack of information on the attitudes of nursing students toward nutrition prompted the development of an attitude questionnaire. Questionnaire development involved three objectives: (1) to develop attitude statements describing the parameters of nutrition and patient care; (2) to utilize conceptual and empirical methods of scale construction; and (3) to contrast reliability estimates of scales. All items or attitude statements were evaluated in ac-

cordance with Edwards' criteria of attitude item construction. Final statements were submitted to a panel of judges for content analysis. Attitude statements were then subjectively assigned to one of the following scales: normal nutrition; therapeutic nutrition; the nurses' role in nutrition education; and nutrition in nursing curriculums. Responses to attitude statements by 124 nursing students were statistically analyzed. Sixty-five of the students were enrolled in a practical nursing program, 35 in a hospital-based diploma program, and 24 in a baccalaureate degree program. Agreement was expressed with the statement emphasizing patients' expectations of the nurse's role in nutritional care. Most nursing students felt that nutrition should be included in the curriculum. Supporting data are tabulated.

HRP-0030141/6 Not Available NTIS
Catholic Univ. of America, Washington, DC.
Role of the Nurse in the Bioethical Decision-Making Process.
Sister Francesca Lumpp. 1979, 9p
Pub. in Nursing Clinics of North America v14 n1 p13-21 Mar 79.

The relationality-responsibility theory is proposed as a framework for defining the role of nurses in bioethical decisionmaking. As background information for the proposed theory, two other ethical theories are explained: (1) teleologic theory, which examines the end or goal of an action to ascertain ethical implications; and (2) deontologic theory, which derives its approach to ethical action from formal principles and rules. The relationality-responsibility theory views an action by looking at multiple and complex relationships within which an action takes place. In this theory, the nurse-client relationship is the focal point. Concentric circles expand from the focal point to include relationships with family, community, and society. Intersecting concentric circles are relationships with other health team members, the bureaucracy of hospital administration, the nursing profession, and the legal system. These relationships represent possible conflict points. The moral responses of nurses are based on their life experiences, including formal and informal education in the area of bioethics. Advocacy for clients implies reverence and fidelity. Two case histories are cited to illustrate application of the relationality-responsibility theory.

HRP-0030142/4 Not Available NTIS
Colorado Univ. Medical Center, Denver. School of Nursing.
School Nurses' 'Family Assessment Tool'.
Sandra J. Holt, and Thelma M. Robinson. 1979, 4p
Pub. in American Jnl. of Nursing v79 n5 p950-953 May 79.

The use of a family assessment tool to help school nurses understand children and their families is addressed. Use of the tool, with school nurses serving as liaison persons, provides for more meaningful exchange of ideas. Other benefits of using the tool are the inclusion of families in health decisions and the identification of variables affecting desired change. Before nursing visits, demographic data and pertinent medical and health data are compiled. A physical, emotional, and social profile of the home environment is formulated. The ethnic background of families and their lifestyles, or personal values, can affect perceptions of education; observations of family communication patterns can indicate stability. The focus of nursing goals should be on relevant and attainable measures. Information about a child is summarized after the home visit, with problems identified by the nurse and the family listed. In addition, the strengths and weaknesses of the family are noted. Recommendations to facilitate use of the family assessment tool are offered: obtain past medical records and consult with family physicians; identify emotional problems affecting performance through psychological or psychiatric evaluation; assess medical or educational methods to improve school performance; and coordinate and complement the successful behavior modification program of mothers. The tool is included.

HRP-0030184/6 Not Available NTIS
Pittsburgh Univ., PA. Dept. of Health Services Administration.
Proceedings of the New Concepts in Human Services for the Developing Young Child Held at Pittsburgh, Pennsylvania on April 2-6, 1978.
William T. Hall, and Christine L. Young. 1978, 136p
Available from Univ. of Pittsburgh, Dept. of Health Services Administration, Pittsburgh, PA 15261.

The essays in this volume were presented at an institute whose purpose was to provide a format for discussing recent trends affecting health services for mothers and children. These trends related to increased scientific knowledge regarding the development of infants and very young children, social changes in family life, and changing patterns of health service delivery. The broad areas dealt with by the papers include the physical development of the young child, the psychosocial development of this age group, services for infants and young children, programing issues, and research and evaluation in social work with the young handicapped child. Among the specific topics considered are the Vietnamese family's perceptions of health care, early peer relations, supplemental security income legislation, and neurological problems in the developing child. Workshop sessions dealt with such areas as: followup services for high-risk infants, with particular attention to the experience of the Magee Women's Hospital in Pennsylvania; planning health and social services for a rural area; and the team approach. Photographs and references are included.

HRP-0030185/3 Not Available NTIS
American Thoracic Society, New York. Scientific Assembly on Environmental and Occupational Health.
Health Effects of Air Pollution.
Carl M. Shy, John R. Goldsmith, Jack D. Hackney, Michael D. Lebowitz, and Daniel B. Menzel. 1978, 78p
Available from American Lung Association, 1740 Broadway, New York, NY 10019.

This discussion, which is directed to informed laymen, physicians, and the staff and volunteers of the American Lung Association and its constitutents, is meant to outline the available knowledge about the effects of air pollution on human health. Particular attention is given to the respiratory system. Following an introductory section dealing with the purpose and scope of the monograph, the discussion turns to the effects of air pollution on human populations. Evidence that exposure to air pollution has been associated with excess mortality, acute and chronic respiratory disease, disturbances in ventilatory function, asthma, heart disease, sensory and central nervous system effects, and tissue residues is presented. Subsequent material is concerned with the health effects and mechanisms of action of specific air pollutants on affected organ systems and issues associated with the assessment of human health risks of exposure to air pollution. Examples of efforts to evaluate overall health risks are provided. A 403-item bibliography accompanies the text.

HRP-0030186/1 Not Available NTIS
Weight Watchers International, Inc., New York.
Nutrition in the Community -- The Art of Delivering Services.
Reva T. Frankle, and Anita Yanochik Owen. 1978, 395p
Available from C. V. Mosby Co., 11830 Westline Industrial Dr., St. Louis, MO 63141.

This textbook discusses community nutrition in terms of major public health, political, legislative, administrative, and academic advances in public knowledge and attempts to indicate how available knowledge can proide new goals and methods for designing nutrition programs. In addition, guidelines for managing the nutritional problems of such groups as migrant workers are presented and nutritional status assessment criteria and methodologies available to health workers are outlined. Specific topics addressed are the need for a national nutrition policy, the role of the public health nutritionist, program planning, community assessment, planning process elements, priority setting, strategies at the local level for community nutrition programs, the action plan (i.e., the method for achieving objectives), and nutritional assessment. Evaluation, budgeting, legislation, grants and grantsmanship, and the future course for nutrition services are also discussed. Each chapter is accompanied by a list of learning outcomes for students. A glossary and a list of recommended readings are included.

HRP-0030210/9 Not Available NTIS
Utah Univ., Salt Lake City. Coll. of Nursing.
Equilibrium Theory Applied to Small Nurse Groups.
Maeona K. Jacobs. 1979, 17p
Pub. in Advances on Nursing Science v1 n2 p23-39 1979.

Components of the Bales theory were tested in this study to predict equilibrating movements within groups of nurses. The interaction process analysis method, developed by Bales, defines a small group as persons involved in interaction with each other on a face-to-face basis in a single meeting or in several meetings. Using the Bales theory, the interaction processes of small groups of nurses were assessed to verify three statements: (1) there is an overall balance or equilibrium and regularity in the number of interactive events in a small goal-oriented group; (2) there is an alternation between primary emphasis on social-emotional-expressive and task-related interactive behavior; and (3) there is sequential movement from initial questioning acts to medial answering acts to final positive or negative acts. Data were obtained from a small nursing unit, with four to five patients. Patients were critically and acutely ill and had recovery potential. Differences between the Bales theory nurse groups and other nurse groups were explained by different work situations, goals, and responsibilities. Further study of effective goal movement and equilibrium among nurses is recommended. Tables and illustrations are included.

HRP-0030211/7 Not Available NTIS
Ethical Choice in Nursing.
Paula Sigman. 1979, 16p
Pub. in Advances in Nursing Science v1 n3 p37-52 1979.

Responsible choices in the ethical practice of nursing and the issue of whether ethical behavior should be incorporated in nursing curriculums are examined. A model approach to decisionmaking is described that notes certain influences affecting decisions. These factors include values, knowledge, attitudes, principles, past experiences, mores, background, beliefs, philosophies, and concerns. For professional nurses, decisions are essential to daily functions. Ethical choices based on responsible ethical behavior involve accountability, risk, commitment, and justice. Ethical behavior occurs when a moral principle exists that involves an obligation or duty to do or to refrain from doing something, when some source of responsibility and reward or punishment are involved, when the cause of behavior is internal to the individual, and when behavior itself is not the result of ignorance. Ethical behavior is generally not incorporated in nursing curriculums. If ethics teaching is to be incorporated in curriculums, four assumptions must be made: (1) it is possible to influence and develop responsible ethical behavior by courses offered in baccalaureate and advanced nursing curriculums; (2) professional nurses are increasingly aware of the ethical dimensions of their work; (3) ethics courses can foster more ethical consciousness; and (4) experience can promote ethical intelligence. Ethical dilemmas faced by nurses in clinical settings and by students in formal class settings must be considered.

HRP-0030213/3 Not Available NTIS
Texas Woman's Univ., Dallas.
Ethics of Caring.
Barbara A. Carper. 1979, 9p
Pub. in Advances in Nursing v1 n3 p11-19 1979.

Specialization and technology and their impact on the process of caring and the delivery of humanized patient care are discussed. Ethical aspects of patient care should be of concern to all health care providers, including nurses. In specialization, there is a tendency to devalue individuals. The problem related to science and technological developments is that health care providers tend to generalize scientific and technical expertise into the realm of individual patient values and beliefs. The components of the caring process that should be considered by health care providers are knowledge,

alternating rhythms (ability to maintain or modify behavior according to variations in circumstances or perspectives), patience, honesty, trust, humility, hope, and courage. Four key issues related to caring involve: (1) the nature of the health care provider-patient relationship; (2) informed consent; (3) determination of the quality of life; and (4) determination of ethical participation in decisionmaking. Models of the physician-patient relationship are noted, and ways in which health care providers can learn to be more humane are described.

HRP-0030214/1 Not Available NTIS
Presbyterian Hospital, New York.
Evaluating Newly Employed Nurses' Skills.
Martha Schmidt Kaelin, and Julie Beshore Bliss. 1979, 4p
Pub. in Nursing Outlook v27 n5 p334-337 May 79.

This article discusses the need to evaluate the skills of nurses, regardless of their self-ratings, amount of experience, or educational background. At one hospital, assuring the competency of nurses was a problem for the inservice education department. The problem was how to teach appropriate skills and validate competence in performing these skills. The concept of a skills laboratory was devised to orient nurses on their first day of work. After receiving a list of skills, newly employed nurses were asked to rate themselves. Experienced nurses rated themselves as competent more frequently than did inexperienced nurses. Data collected over a 10-month period specifically indicated that all nurses had some experience in giving injections but had little experience in irrigating a nasal-gastric tube or performing a specific gravity test. The failure rate for experienced and inexperienced nurses in overall competence was similar before the institution of the teaching component of the skills laboratory. The teaching component reduced the failure rate of inexperienced nurses more than that of experienced nurses. When self-ratings were correlated with educational background, it was determined that any nurse can be successfully taught certain skills using a performance checklist, necessary equipment, and supplementary instruction. The skills laboratory is viewed as an effective way to improve inservice education, staff development, and patient care. Supporting data are provided.

HRP-0030297/6 Not Available NTIS
People in Crisis -- Understanding and Helping.
Lee Ann Hoff. 1978, 336p
Available from Addison-Wesley Publishing Co., Inc., Jacob Way, Reading, MA 01867.

This book on persons in crisis and those who assist them is intended for front line crisis workers (e.g., nurses and teachers), specialized crisis workers, health and mental health educators, persons planning to develop crisis services, and readers who want to understand and gain from their own personal crises. The discussion opens with a review of the nature and practice of crisis intervention. Among the topics discussed are understanding, identifying, and helping persons experiencing crisis; the psychosocial component of human growth; families and communities in crisis; the interaction between the individual, family, and community; and assisting self-destructive people and the survivors of suicide. The principles and techniques of crisis intervention are then illustrated with the help of case examples showing the way in which health, welfare, and rescue workers can work with mental health and crisis specialists. Finally, information on the organization and delivery of suicide prevention and crisis services is provided. Service forms are appended.

HRP-0030334/7 Not Available NTIS
Wright State Univ., Dayton, OH.
Child Health Maintenance -- Concepts in Family-Centered Care. 2nd Edition.
Peggy L. Chinn. 1979, 934p
Available from the C. V. Mosby Co., 11830 Westline Industrial Dr., St. Louis, MO 63141.

Child health nursing is discussed in a text intended for both students and practitioners. The opening chapters cover the processes of growth and development, present a conceptual frame of reference to be used by nurses in understanding the child and providing sound nursing care, explore factors that enhance the achievement of mature life competencies, and discuss the history of child nursing, the implementation of health care for children, and nursing assessment of the child. In addition, a general description of nursing management of children's health needs is provided, and material on the features and problems of culture and environment, the predominant features of the family unit, and crisis within the family unit is presented. Subsequent sections provide detailed descriptions of each age group (from the prenatal period through adolescence), health problems, and nursing concerns associated with them. Attention is given to such problems as hospitalization, death and dying, long-term physical problems, learning problems, and social and inner problems. Drawings, photographs, and study questions are included.

HRP-0901339/2 Not Available NTIS
American Hospital Association, Chicago, IL. Center for Multihospital Systems and Shared Services Organizations.
Washington Invitational Conference on Multihospital Systems and Shared Services Organizations. Summary of Proceedings.
Sep 78, 24p
Available from American Hospital Association, 840 N. Lakeshore Dr., Chicago, IL 60611.

This document provides summaries of speeches and open discussions from a 2-day forum for Federal policymakers and multihospital or shared service executives which was held in June 1978. A list of speakers, a keynote address summary, and summary of open meetings is included for each of four topic areas: health finance; regulation and legislation; health planning; and quality of care. The introductory speech deals with three categories of shared health systems: shared services or affiliations composed of existing corporations; chain organizations; and regional multiunit organizations. Incentives for Federal interest in multiunit management and studies of the approach are cited. Finance issues ranged from Health Care Financing Administration moves to encourage the cooperative approach, to needed changes in Federal reimbursement policies to facilitate shared services. Both positive and negative impacts of legislation and regulations on multihospital systems (MHS's) are summarized. Other major topics include the relationship between federally mandated health planning and MHS's, quality assurance issues in MHS's, and potential consequences of a larger Federal role in MHS development.

N80-14674/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Rhythmic Photostimulation on Monkeys with Hyperkinesis of Post-Encephalitic Genesis.
I. V. Danilov, and N. N. Kudrayatseva. Dec 79, 12p NASA-TM-75986
Contract NASW-3199
Tran-Transl. Into English from Fiziol. Zh. Sssr, (Ussr), V. 68, No. 4, 1972 p 511-516. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif.

In hyperkinetic monkeys a response opposite to that of healthy monkeys was observed during rhythmic photostimulation (frequency 3, 9, 18, 20, and 25/sec), i.e., the hyperkinesis disappeared. The significance of rhythmic excitatory cycles for interconnections between different brain structures is discussed.

PB80-126162 PC **A05**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Interview Data on Chronic Conditions Compared with Information Derived from Medical Records.
Vital and health statistics series,
William G. Madow. May 67, 93p PHS-PUB-1000-SER-2-23
See also PB-282 497. Pub. as Vital and Health Statistics Ser 2-23. Library of Congress catalog card no. 67-60023.

The report describes the accuracy and completeness with which chronic conditions are reported from household interviews as compared to those recorded by physicians. Included in the report are samples of the household questionnaires.

PB80-126170 PC **A03**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Sample Design and Estimation Procedures for a National Health Examination Survey of Children.
Vital and health statistics series,
E. Earl Bryant, James Baird, and Henry Miller. Aug 71, 49p VHS/SER-2/43, DHEW/PUB/HSM-72/1005
Library of Congress catalog card no. 76-608549.

The report presents a detailed description of the sample design and estimation procedures employed by the Health Examination Survey in a nationwide survey of youths 6-11 years of age in the noninstitutional population of the United States.

PB80-126196 PC **A03**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Disability Components for an Index of Health.
Vital and health statistics series,
Daniel F. Sullivan. Jul 71, 41p PHS-PUB-1000-SER-2-42
Library of Congress catalog card no. 72-608548.
Pub. as Vital and Health Statistics Ser-2-42.

The report is a methodological study of a collective measure of several forms of disability intended for use as one component of a joint mortality-morbidity index.

PB80-126051 PC **A03**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Quality Control in the Hospital Discharge Survey.
Vital and health statistics series,
Kenneth W. Harris, and Keith L. Hoffman. Dec 75, 50p VHS-SER-2/68, DHEW/PUB/HRA-76/1342
Library of Congress catalog card no. 75-619242.

The report contains a detailed description of the quality control, process control, and editing techniques employed in the National Center for Health Statistics continuing Hospital Discharge Survey.

PB80-126069 PC **A03**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
United States Life Tables by Dentulous or Edentulous Condition, 1971 and 1957-58.
Vital and health statistics series.
T. N. E. Greville. Aug 74, 29p VHS/SER-2/64, DHEW/PUB/HRA-75/1338
Library of Congress catalog card no. 74-7204.

The report shows the numbers of survivors by age, sex, and dentulous or edentulous condition, and average remaining lifetime by age and sex, classified by dentulous and edentulous years. It is based on data collected in household interviews in 1971 and 1957-58.

PB80-126085 PC **A04**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
National Vital Statistics Needs.
Sep 65, 59p PHS-PUB-1000-SER-4-2
Pub. as Vital and Health Statistics Ser-4-2.

The report is an analysis of the role of the National Vital Statistics agency, with recommendations concerning the procurement and production of regular annual data, the need for special studies, provision of technical services to the States and other policy questions.

PB80-126119 PC **A04**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Net Differences in Interview Data on Chronic Conditions and Information Derived From Medical Records.
Vital and health statistics series,
William G. Madow. Jun 73, 67p VHS/SER-2-57, DHEW/PUB/HSM-73-1331
Library of Congress catalog card no. 73-600034.

The report shows a methodological study of the completeness and accuracy with which chronic conditions are reported by health plan enrollees in

household interviews as compared with information recorded by physicians.

PB80-128127 PC **A06**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Comparability of Mortality Statistics for the Seventh and Eighth Revisions of the International Classification of Diseases, United States.
Vital and health statistics series,
A. Joan Klebba, and Alice B. Dolman. Oct 75, 103p VHS/SER-2-66, DHEW/PUB/HRA-76-1340
Library of Congress catalog card no. 75-619043.

The report shows the changes of methodology within the seventh and eighth revision of the International Classification of Diseases, the meaning of Comparability Ratios and the use of ratios as revision factors.

PB80-128416 PC **A11**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Selected National Data Sources for Health Planners.
1975, 233p DHEW/PUB/HRA-76/1236
See also HRP-0002546.

The publication provides a set of references to the most useful sources of data available from National Organizations for meeting the needs of State and Local health Planners, particularly the Health Systems Agencies and the State Health Planning and Development Agency-established under Public Law 93-641 (The National Health Planning & Resources Development Act). This publication is intended to include publications of data and data tapes. They include only sources made generally available by Public and private organizations such as Government agencies, professional associations, and private research corporations.

PB80-129232 PC **A02**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Effect of Organizational Structure on Community Mental Health Center Operations - Executive Summary.
Final rept.,
Alexandra Walcott. Jul 79, 21p HEW/REG-2-78-1-ES
Contract DHEW-120-78-0005
See also PB80-129307.

Community mental health centers (CMHCs) developed under Public Law 94-63 and predecessor legislation exhibit a variety of organizational structures and sponsorship relationships, partly because of historical evolution, partly because of available resources, and partly because of the way federal requirements and local realities have been meshed. The purpose of this study was to determine the nature of the various CMHC organizational structures and how they impact on effectiveness and efficiency of overall center operations. Once the relationships between organizational structure and effectiveness and efficiency were determined, the purpose of the work was to develop ways that could help centers manage their own operations more effectively as well as provide NIMH with tools that would be useful as they worked with the centers in their region.

PB80-129471 PC **A03**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Optimum Recall Period for Reporting Persons Injured in Motor Vehicle Accidents.
Vital and health statistics series,
William S. Cash, and Abigail J. Moss. Apr 72, 39p VHS/SER-2-50, DHEW/PUB/HSM-72-1050
Library of Congress catalog card no. 78-179927.

In this report a methodological study designed to test the effectiveness of different recall periods for the reporting of motor vehicle injuries in health interviews, based on the comparison of data from motor vehicle accident report forms and data from household interviews.

PB80-129489 PC **A02**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Reliability of Estimates with Alternative Cluster Sizes in the Health Interview Survey.
Vital and health statistics series,
Joseph Waksberg, Robert H. Hanson, and Curtis A. Jacobs. Apr 73, 25p VHS/SER-2-52, DHEW/PUB/HSM-73-1326
Library of Congress catalog card no. 72-600131.

The report presents the findings of one of a series of research projects designed to evaluate the efficiency of the sample design of the Health Interview Survey. The study focuses on one feature of the design-namely, cluster size and associated intraclass correlations.

PB80-129505 PC **A03**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Vision Test Validation Study for the Health Examination Survey Among Youths 12-17 Years.
Vital and health statistics series,
Jean Roberts. Dec 73, 44p VHS/SER-2-59, DHEW/PUB/HRA-74-1333
Library of Congress catalog card no. 73-600218.

The report discusses the validation of selected parts of the vision test battery used in the Health Examination Survey of 1966-70 among youths 12-17 years of age against a standard clinical ophthalmological examination for distance visual acuity and eye muscle imbalance.

PB80-133630 PC **A10**/MF **A01**
Goldman (Laura Carole), Hyattsville, MD.
Perspectives of Balance: A Study of Health Traditions in Iluman, Ecuador.
Master's thesis,
Laura Carole Goldman. Jun 79, 220p
Sponsored in part by Agency for International Development, Washington, DC.

In Iluman, a rural village in highland Ecuador, perceptions of health, including the hot/cold dichotomy, are meaningful, integrated components of a system that provides plausible explanations for illness, and determines prescribed methods for maintaining and restoring balance and well-being. Foods, plants and remedies are categorized, often as binary opposites, according to the perceived beneficial or harmful effects they have during times of vulnerability or sickness. It is believed that when the body's equilibrium is upset by extremes in diet, behavior, or environment, sickness occurs; treatment is directed at opposing the cause of imbalance in accordance with cultural rules. The health perceptions described in this paper reflect the influence of indigenous and introduced medical and religious philosophies, folk customs, and the interaction with modern health care delivery systems; they are representative of a larger worldview, and influence acceptance or rejection of non-indigenous approaches to nutrition and health. The author views traditional systems in conflict with health programs based on modern or scientific models, and demonstrates through anecdote and example that when tradition is ignored or devalued, the effectiveness of health and nutrition efforts is either significantly diminished or completely negated; however, when programs incorporate tradition, more adequate and culturally appropriate services are provided to rural communities.

PB80-930000 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
A Subscription to the Complete Set of Cancergrams.
1980, approx. 1284 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Single copies also available in paper or microfiche.

This subscription item makes available all of the cancergrams released yearly by the International Cancer Research Data Bank Program of the U.S. National Cancer Institute. Every few weeks updated cancergrams containing abstracts of selected cancer-related articles recently published in more than 1500 journals are announced. There are 107 different cancergrams topics available. The broad breakdown of these topics is as follows: Specific types of viruses; mechanism of viral carcinogenesis; other cancer virology topics; cancer immunology; cancer biochemistry and endocrinology; other cancer biology; types of carcinogenic agents; human carcinogenesis; carcinogenesis of specific organ sites; mechanism of carcinogenesis; detection and screening; diagnosis and therapy of specific types of cancer; specific therapeutic and diagnostic; and other aspects of cancer therapy.

PB80-930500 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Oncofetal Proteins.
Cancergram CB01.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The Cancergram examines the association between tumor antigens and other tumor products, and similar markers manifested by embryonic and fetal cells. Included within this purview are carcinoembryonic antigens (CEA).

PB80-930600 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Immunobiology and Cancer: The Major Histocompatibility Complex.
Cancergram CB03.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

This Cancergram covers investigations of all mammalian histocompatibility systems, HLA, HLB, H-2, AgB, Ia, and other minor histocompatibility antigens. It includes other immunogenetically defined processes such as MLC and MLR. Specific emphasis will be placed on the following: isolation, characterization and structure, gene mapping, association with disease, and phenotypic alterations.

PB80-930700 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Immunobiology and Cancer: Antibodies and Humoral Immunity.
Cancergram CB06.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

Antibodies generated against in situ and transplanted tumors are within the scope of this Cancergram. Abstracts included concern studies of both exogenously administered (immunization) and endogenously produced antibodies. Autoimmunity is included when related to anti-tumor activity. Any other immune resistance factors not readily identifiable as tumor antibodies but with similar characteristics are also covered. Circulating antigen-antibody complexes, and other factors which block the immune response to tumors, are of high interest.

PB80-930800 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Immunobiology and Cancer: Tumor-Associated Antigens.
Cancergram CB05.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The Cancergram covers all tumor-associated and tumor-specific antigens (TSTA, TMTA, TATA, and TAA) with the exception of oncofetal antigens (covered by Cancergram B001) and viral antigens unrelated to neoplasia. Abstracts included concern both intracellular and surface antigens, with emphasis on the latter. Also covered are antigens from tumors derived from patients (colon cancer, leukemias, etc.) when studied from a non-clinical standpoint. Viral antigens, only when appearing concomitantly with tumors, and histocompatibility antigens, only when directly related to tumor incidence and development, are also within the scope of this Cancergram.

PB80-931100 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.

Cell Biology: Cell Kinetics.
Cancergram CB09.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

Within the purview of cell kinetics are all studies relating to the characterization and measurement of cell cycle parameters, particularly for in vivo studies of normal and tumor cells, and in vitro studies of derived cell lines. Methodologies for measuring the rates and timing of mitotic activity are highly relevant; however, investigations relating to associated metabolic intracellular events during the process of division are not in scope. Of related interest are the effects of exogenous agents, both chemical and physical, on cell kinetics and any events or activities that are cell cycle-dependent or specific. Growth regulation related to endogenous factors is generally excluded, as it is covered by Cancergram CB16.

PB80-931300 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cell Biology: Cytogenetics.
Cancergram CB12.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

All studies concerned with karyotype analysis, banding patterns and other microscope techniques for investigating chromosome number, identification and abnormalities are included. An overview of agents resulting in chromosomal or chromatid damage is essential to the scope of this Cancergram. All gene mapping studies which require cytogenetic analysis to establish the linkage groups for specific genes are included. Clinical studies associating chromosomal abnormalities with risk or presence of cancer are also in scope.

PB80-931800 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Immunobiology and Cancer: Identification and Characterization of Immune Cells.
Cancergram CB17.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

This Cancergram concerns markers used in characterization of cells associated with the immune system in normal and neoplastic states. These include surface antigens, surface immunoglobulins, specific immune receptors (Fc and complement), and rosetting phenomena, as well as other markers which specifically characterize leukocytes. Areas of interest include characterization of leukemic and lymphoma cells; studies of normal leukocyte markers; alteration of these markers after immune activation, neoplastic transformation and treatment with chemical or physical agents; and the detection and characterization of these markers in other normal and neoplastic cells. Tumor-associated and virus-related antigens are not in scope and are covered in Cancergrams CB05 and CB13, respectively.

PB80-935700 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Gastrointestinal Tract.
Cancergram CK09.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

This is an organ-specific Cancergram that deals with carcinogenesis in the esophagus, stomach, small intestines, colon, and anus of both humans and experimental animals. The scope includes the occurrence and etiology of gastrointestinal cancer in the human population, the occurrence and induction of gastrointestinal cancer in experimental animals, carcinogenic mechanisms, and the biological, physiological and morphological aspects of the development of gastrointestinal cancer. This Cancergram specifically excludes studies of carcinogenesis of the buccal cavity, liver, gallbladder, bile ducts, and pancreas, which will be covered in other Cancergrams. It also generally excludes studies of diagnosis, treatment, and the pathology of gastrointestinal cancer, except where such studies contribute to the understanding of the carcinogenic process. These clinical aspects are covered by Cancergrams CT07 (Colo-Rectal Cancers) and CT19 (Upper Gastrointestinal Tumors).

PB80-935800 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Mechanisms of Carcinogenesis: Activation and Metabolism of Carcinogens.
Cancergram CK08.
1980, approx 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

This is the first of a series of mechanism-oriented Cancergrams, and deals with the initial metabolic events occurring after exposure to chemical carcinogens. The scope includes the activation, metabolism, and detoxification of carcinogens; the biochemistry of carcinogen metabolites; the role and induction of enzymes in carcinogen metabolism; the role of metabolic activaton in carcinogen screening tests; and other related studies. Macromolecular binding of carcinogen metabolites is included only where the studies provide evidence for metabolic activation or information about the chemistry of the metabolites; a comprehensive treatment of macromolecular binding is included in the second Cancergram of this series, CK11.

PB80-936000 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Mechanisms of Carcinogenesis: Macromolecular Alteration and Repair.
Cancergram CK11.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The Cancergram covers all aspects of the interaction of carcinogens and their metabolic products with macromolecules of the cell. The scope includes macromolecular binding of carcinogens, other macromolecular alterations by carcinogens, repair or reversal of macromolecular alterations, enzyme systems involved in repair or reversal, effects of macromolecular alteration on cell function (exclusive of malignant transformation), and genetic aspects of repair of damaged macromoleculs, including the human disease, xeroderma pigmentosum. By extension, the Cancergram also covers studies of the interaction in vitro of carcinogens with natural or synthetic macromolecules. The scope excludes all studies of carcinogen metabolism, which is covered in Cancergram CK08, and also excludes studies of carcinogen binding to macromolecules where the purpose of the binding data is only to provide evidence of the existence of metabolic activity.

PB80-936300 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Liver.
Cancergram CK16.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The Cancergram covers all aspects of the etiology of cancer of the liver and biliary tract. Areas covered include occurrence and presumptive cause of hepatic cancer in the human population, experimental induction and modification of hepatic cancer, and morphological, biochemical, and other biological effects associated with the induction, development, or occurrence of hepatic cancer. Metabolism of known or suspected specific hepatocarcinogens is covered, but carcinogen metabolism is otherwise excluded, since this is the subject of Cancergram CK08. This Cancergram includes studies of biological or pathological phenomena associated with the presence of hepatic cancer, but generally excludes studies specifically related to diagnosis or treatment.

PB80-936600 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Kidney and Urinary Tract.
Cancergram CK17.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

This Cancergram covers all aspects of the etiology of cancer of the kidney and urinary tract. Areas covered include occurrence and presumptive cause of urinary tract cancer in human populations, experimental induction and modification of urinary tract cancer, and morphological, biochemical, and other biological effects associated with the induction, development, or occurrence of urinary tract cancer. This Cancergram specifically excludes carcinogenesis studies of the prostate, testes, scrotum, or penis, which are covered in Cancergram CK18 (reproductive tract carcinogenesis). Studies concerning diagnosis, therapy, and pathology are generally excluded except where they contribute to the understanding of kidney and urinary tract carcinogenesis. Related clinical studies are the subject of Cancergram CT16, entitled Genito-urinary Cancers--Diagnosis, Treatment.

PB80-937000 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Lymphatic and Hematopoietic Tissues.
Cancergram CK20.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

This Cancergram covers the occurrence, induction and development of lymphoreticular malignancies, both in humans and in animals. Cancers considered include acute and chronic leukemias, lymphomas, plasmacytomas and such predisposing neoplastic conditions as polycythemia vera. Relevant epidemiological studies are included. Emphasis is placed on experimental studies of lymphatic and hematopoietic carcinogenesis by viruses, irradiation and chemical agents in test animals, and on related studies of transformation in cell cultures. Studies concerning properties of transformed lymphatic or hematopoietic cells are included where they shed light on aspects of lymphoreticular carcinogenesis. These studies include viral, biochemical, immunological, morphological and cytogenetic characterizations of malignant lymphoreticular cells. Oncogenic progression from benign neoplastic conditions to lymphoreticular malignancy is considered. This Cancergram specifically excludes studies of the diagnosis, treatment, and control of lymphatic or hematopoietic cancers, as these topics are covered by Cancergrams CT03, CT05, and CT13.

PB80-937600 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cancer Detection and Management: Nuclear Medicine.
Cancergram CT02.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for qucte. Also available in single copies PC E01/each issue.

The Cancergram covers all aspects of the clinical use of radionuclides or nuclear medicine techniques in the care of cancer patients. It also includes any preclinical studies of various radionuclides or techniques considered to have direct

clinical diagnostic relevance. Other basic biologic, pharmacologic, or metabolic studies where radionuclides are used as tracers will generally be excluded. Radiotherapy is covered by Cancergram CT15, and Diagnostic Radiology by Cancergram CT14.

PB80-938100 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Colo-Rectal Cancers: Diagnosis, Treatment.
Cancergram CT07.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The Cancergram covers clinical aspects of cancers of the anatomical region included from the appendix downward to the anus. Studies of the small bowel, excluded here, appear in Cancergram CT19, Upper Gastrointestinal Tumors. Abstracts included here concern clinically relevant aspects of the prevention, detection, evaluation, diagnosis, and therapy of colonic neoplasms in humans. With certain exceptions, the topic excludes general carcinogenesis, animal system studies, or general preclinical studies not directly relevant to clinical applications. Related carcinogenesis studies are covered by Cancergram CK09.

PB80-938400 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Pediatric Oncology.
Cancergram CT10.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The concept of this topic includes childhood tumors of the kidney, brain and CNS system, lymphomas and sarcomas, and other soft tissue tumors. Abstracts concerning childhood leukemias are included only on a very selective basis, as the topic is coomprehensively covered by Cancergram series CT03. This Cancergram covers clinically relevant aspects of the prevention, detection, evaluation, diagnosis, and therapy of solid tumors in children. With certain exceptions, the topic excludes animal studies, general preclinical studies, and general carcinogenesis studies, not directly relevant to clinical applications.

PB80-938500 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Neoplasia of the Head and Neck: Diagnosis, Treatment.
Cancergram CT11.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The Cancergram covers clinically relevant aspects of tumors associated with the head and neck regions. This concept excludes brain and CNS neoplasms, which are covered by Cancergram CT18. Abstracts are included concerning the prevention, detection, evaluation, diagnosis, and therapy of head and neck tumors. With certain exceptions, the topic excludes animal or preclinical studies, general carcinogenesis, and preclinical tissue culture experiments not directly related to clinical applications.

PB80-938700 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Sarcomas and Related Tumors: Diagnosis, Treatment.
Cancergram CT12.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The Cancergram focuses on clinical aspects of sarcomas involving soft tissue and bone, and also includes abstracts on related malignant and benign tumors. Soft tissues are considered as all non-epithelial extra-skeletal tissues of the body, with the exception of the reticuloendothelial system, the neuroglia, and visceral and parenchymal organs. Included, therefore, are sarcomas of the vascular system, fatty tissues, muscle tissues, connective tissues, and synovial tissues. Bone tumors included are osteosarcoma, chondrosarcoma, adamantinoma, chondroblastoma, Ewing's sarcoma, and other benign and malignant disorders of the bone. This Cancergram excludes disorders of the bone marrow, which are the subjects of separate Cancergrams (see seris CT03 for leukemias and series CT13 for multiple myeloma). The scope includes diagnosis and staging, supportive care, evaluation, and therapy. Selected abstracts concerning epidemiology, etiology, and other preclinical studies will also be included where they have direct clinical relevance.

PB80-939000 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Clinical Treatment of Cancer: Radiation Therapy.
Cancergram CT15.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

This Cancergram covers all forms of radiotherapy being used in the treatment of cancer, including standard X-ray, cobalt 60 and radium irradiation as well as high linear energy transfer (LET), megavoltage, electron beam treatment, and radioactive interstitial implants. Coverage of this topic includes adverse effects of radiotherapy, radiocurability, radiodosimetry, radiosensitization, and studies with specialized instrumentation such as the betatron and linear accelerator. Radiobiology, animal experiments, tissue culture experiments, carcinogenesis, and other preclinical studies will not be included except for those considered to have direct clinical relevance.

PB80-939200 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
CNS Malignancies: Diagnosis, Treatment.
Cancergram CT18.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

This Cancergram covers clinical studies concerning all cancers of the brain and spinal cord nerves. Emphasis is upon site-related reports concerning screening, detection, diagnosis, and therapy. Abstracts pertaining to etiology, epidemiology, or other preclinical aspects of nervous system cancer are included only on a very selective basis. The scope of this Cancergram does not include general cancers of the head and neck, as these topics are covered by Cancergram CT11.

PB80-939300 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cancer Detection and Management: Biological Markers.
Cancergram CT01.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

This Cancergram provides research information on tumor markers of clinical importance. Tumor markers are here considered as any condition or parameter detectable in cancer patients which relates to the presence of a tumor. This includes any detection system related to tumor products, tumor product activity, or host responses to tumor products. Of specific interest are reports concerning markers for the risk, presence, extent, stage, or histological type of cancer in patients. This includes reports on new tests (marker candidates), the development or improvement of tests or techniques, and the clinical use and appraisal of such tests. As the emphasis is on clinically important markers, preclinical material lacking direct clinical importance is largely excluded.

PB80-939400 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Upper Gastrointestinal Tumors: Diagnosis, Treatment.
Cancergram CT19.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The Cancergram covers all clinical aspects of tumors of the esophagus, stomach, small intestine, liver, pancreas, gall bladder, and associated ducts. Emphasis is upon detection, diagnosis, and therapy, although selected preclinical studies with special relevance to clinical situations will also be included. Tumors of the lower gastrointestinal tract are the subject of a separate Cancergram CT07. Carcinogenesis studies are covered by Cancergram CK09.

PB80-939600 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Melanoma and Other Skin Cancer: Diagnosis, Treatment.
Cancergram CT22.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

This Cancergram covers all clinical aspects of malignant melanoma involving the skin, as well as other organ systems. Also covered are any other tumors arising in the skin or appendages of the skin, such as the sweat glands, apocrine glands, eccrine glands, or sebaceous glands. Epidermoid conditions, epithelioma, keratinizing conditions, and squamous cell, giant cell, and basal cell carcinomas of the skin ae included. In addition, Paget's disease, Kaposi's sarcoma, and Letterer-Siwe disease are included when they involve the skin or its appendages. All clinical studies of the diagnosis, immunology, and treatment of these cancers are covered. Additionally, the Cancergram includes selected aspects of etiology and epidemiology, and preclinical studies in animal and in vitro systems which are directly relevant to clinical oncology. Mycosis fungoides is excluded, however, because it is covered by Cancergram CT05, Lymphomas.

6F. Environmental Biology

AD-A078 456/1 PC **A03/MF A01**
Cornell Univ Ithaca NY Dept of Agronomy
Microbial Degradation of Pesticides.
Rept. no. 1 (Annual) 1 Oct 78-30 Sep 79,
A. Rosenberg, M. T. Lieberman, and M. Alexander. 16 Nov 79, 50p
Contract N00014-78-C-0044

The toxicity and degradation of pesticides introduced into sanitary sewer facilities has yet to be extensively studied. For this reason, the effect and fate of eight pesticides were investigated using the BOD method with a sewage inoculum. Six of the eight chemicals (Carbaryl, Malathion, Diazinon, Dursban, Dichlorvos, and 2,4,-dichlorophenoxyacetic acid) did not retard oxygen consumption by a 0.33% sewage inoculum in a one-week test period at concentrations ranging from 0.1 to 100 micro g/ml of active ingredient. Baygon at 10 and 100 micro g/ml was toxic in the test period. Ficam at 1 and 10 micro g/ml also slowed oxygen consumption during the decomposition of sewage as compared to a control with no pesticide. The BOD method was used to test the biodegradation of the pesticides with each chemical being used as a sole carbon source for an adapted or unadapted inoculum. Carbaryl was readily degraded, and Malathion and Diazinon also appeared to undergo oxidation, although the reaction was incomplete. Dichlorvos, Baygon, and 2,4-D were resistant to breakdown when tested by the BOD method.

AD-A078 892/7 PC **A02/MF A01**
Georgia State Univ Atlanta Dept of Biology
Degradation of Oil by Yeast and Filamentous Fungi in Arctic Environments.
Final rept. 1 Sep 76-1 Sep 79,
S. A. Crow, and D. G. Ahearn. 30 Nov 79, 13p
Contract N00014-76-C-1058

Approximately 200 yeast isolates from Alaskan tundra, Arctic regions of the North Atlantic and other low temperature environments were screened for low temperature metabolism of hydrocarbons. None of the cultures examined were comparable to Candida lipolytica or Candida maltosa at elevated or low temperatures. Studies of these two yeast have demonstrated that both are capable of oxidizing a range of aromatic hydrocarbons including naphthalene and benzopyrene. Candida maltosa generally grows better on hydrocarbons than C. lipolytica. However, C. lipolytica appears to immobilize large quantities of hydrocarbon. Differences in the uptake of non-growth supporting hydrocarbons have been observed between these two yeasts. (Author)

PB80-127210 PC **A04/MF A01**
California Univ., Los Angeles. Water Resources Center.
Poliovirus Type I Removal by Montmorillonite Clay.
Master's thesis,
Gerald Lee Meronek. 1978, 58p UCAL-WRC-W-523, W80-02408, OWRT-B-184-CAL(4)

The study arises from the problem of underground water contamination by viruses in percolating wastewater or eluted from landspread sludge. Since current water treatment facilities are unable to completely remove viruses from wastestreams, the task of virus removal by soils is required. At present the mechanism by which viruses are removed by soils is unknown. This study attempts to obtain a better understanding of virus transport through soil beds by looking at the adsorption isotherm of poliovirus to montmorillonite clay. Clay was chosen as the adsorbent because of its extremely large surface area and because the percent of clay in soil stands out as the most useful indicator of contaminant soil retention capability. The removal of poliovirus by montmorillonite clay was found to conform to a modified Freundlich isotherm. It was determined however that saturation of the clay particles was not reached so that a complete isotherm was not attained. Virus removal was found to depend on particle size and may be caused by association of the virions with aggregated clay particles.

6G. Escape, Rescue, and Survival

PATENT-4 177 465 Not available NTIS
Department of the Air Force Washington DC
Near-Range Personnel Beacon Locator Apparatus.
Patent,
Donald O. Lundvall, John P. Engels, and Robert R. Yesconis. Filed 6 Oct 78, patented 4 Dec 79, 5p AD-D006 798/3, PAT-APPL-949 189
Supersedes PAT-APPL-949 189-78, AD-D005 580.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A near-range personnel beacon locator apparatus utilizes a tuned tank circuit to receive the emitted signal from an activated personnel beacon. The detected signal is applied to a D.C. amplifier to provide a D.C. level which drives a controlled variable duty cycle timer for driving a light emitting diode indicator. (Author)

6H. Food

AD-A078 620/2 PC **A04/MF A01**
Army Natick Research and Development Command MA
Evaluation of Alternative Field Feeding Systems for Army Field Medical Units.
Technical rept.,
Harry J. Kirejczyk, Thaddeus S. Bonczyk, Gerald Hertweck, and L. Symington. Jul 78, 58p Rept no. NATICK/TR-79/040

The goals of this project were to define, develop and evaluate alternatives to the present M48 field feeding system employed by Army medical units in training and combat. These alternative system designs would not only eliminate the major problems and deficiencies associated with the M48 system, but would be capable of being implemented in the near future without engaging in a major research and development program. To this end, various modifications of two recently developed combat food service systems for the Marine Corps and the Army, the XM-75 and the MKT, in combination with several ward delivery options were considered. An operational evaluation was conducted at Fort Sam Houston in June 1977, under simulated field conditions, to assess their performance and effectiveness and to provide a basis for establishing the preferred alternatives for the different medical units. The result has been to recommend the modified XM-75 system for Combat Support Hospitals, and the reduced XM-75 for non-hospital medical units operating in the forward division area. (Author)

AD-A078 658/2 PC **A04/MF A01**
Letterman Army Inst of Research San Francisco CA
Investigation of Possible Antithiamin Properties in Irradiation Sterilized Beef.
Final rept. 1 May 78-1 Oct 78,
Evelyn L. McGown, Carolyn M. Lewis, and Paul P. Waring. Aug 79, 54p Rept no. LAIR-71

Male and female rats (156 each) were made thiamin-deficient by feeding a semipurified diet devoid of thiamin. They were then repleted with various beef-containing test diets: frozen beef, thermally processed beef, electron or gamma-irradiated beef. All repletion diets contained carefully controlled levels of thiamin. Recovery rates were monitored by growth (weight gain) and measurements of a thiamin-dependent blood enzyme (erythrocyte transketolase). The responses of rats fed irradiated beef were similar to those fed frozen or thermally processed beef. No evidence was found of antithiamin substances in either gamma or electron irradiation sterilized beef. (Author)

AD-A078 695/4 PC **A04/MF A01**
Letterman Army Inst of Research San Francisco CA
The Relationship of Diet to the Performance of the Combat Soldier. Minimal Calorie Intake during Combat Patrols in a Hot Humid Environment (Panama).
Final rept.,
C. F. Consolazio, Herman L. Johnson, Richard A. Nelson, Richard Dowdy, and Harry J. Krzywicki. Oct 79, 70p Rept no. LAIR-76

The objectives were to determine the nutrient and energy intake necessary to sustain an acceptable level of physiological performance with minimum losses of body nitrogen, minerals and water in soldiers performing simulated combat patrols in a jungle environment. Four groups of heat-acclimated and physically conditioned men consumed 585, 948, 1362, and 3301 kcal/day for 10-day periods while on maneuvers in a Panamanian jungle. Body weight losses were minimal in comparison to previous laboratory studies. The three restricted groups averaged 4.1, 4.7, and 4.2% loss of initial body weight. Changes in biochemical parameters of blood from fasting subjects demonstrated that body hypohydration, though present, was considerably less than reported in previous studies. Complete nitrogen balances were not determined because of lack of fecal and sweat collections. Nevertheless net body nitrogen losses were observed when daily energy intake was 1362 kcal or less with a daily protein intake of 54.4 g or less. The daily urinary nitrogen losses of the restricted groups gradually decreased during the experimental phase: which suggests some body adaptation to the low calorie and protein intakes. The major portion of the body weight loss appears to be due to the energy deficit as there was subsequent loss of body fat and some water in the three restricted groups.

AD-A078 708/5 PC **A03/MF A01**
Armed Forces Food Science Establishment Scottsdale (Australia)
Field Evaluation of Australian Ration Packs. Combat Ration (One Man) 1976/77 Packaging Programme Trialled at Exercise Top Point.
Technical rept.,
D. J. Lichtenstein. Sep 79, 32p Rept no. AFFSE-5/79

Menus A, B, C and D of the Combat Ration (One Man) 1976/77 packaging programme were trialled at Exercise Top Point and compared with results from previous trials. With two exceptions these results confirmed previous findings on the acceptability, adequacy and Service suitability of the ration components on trial. These results suggest the need for designing mock-up ration packs for further field evaluation. (Author)

AD-A078 943/8 PC **A11/MF A01**
Army Troop Support Agency Fort Lee VA Directorate of Concepts and Systems
Ingredient Preparation Activity.
Evaluation rept. Jan-Apr 79.
Sep 79, 239p Rept no. CS-SD-7903

The Ingredient Preparation Activity (IPA), formerly a branch of the Central Food Preparation System (CFPS) at Fort Lee, Virginia, was evaluated separately and subsequently to the CFPS evaluation to ascertain the practicality and potential for an autonomous IPA operation. The TRADOC and Fort Lee, as the operators of the CFPS, perceived the IPA as an efficient, cost effective, well received, and highly desirable activity. These characteristics suggested that the IPA should be further analyzed for possible adoption, on a command option basis, as a means for improving the cost effectiveness, quality, and responsiveness of an installation's food service program.

PB80-125693 PC **A05/MF A01**
Appropriate Technology Development Association, Lucknow (India).
Appropriate Technology on Mini-Sugar (Ops Khandsari).
Project report and feasibility study series no. 2,
M. K. Garg. Mar 79, 100p
Sponsored in part by Agency for International Development, Washington, DC.

The publication consists of a feasibility study for the benefit of Indian entrepreneurs as well as for other developing countries who produce sugarcane as a major cash crop. This technology can be used for setting up mini-plants for manufacturing white crystal sugar. The report includes detailed descriptions of working of machinery, equipment, cost of machinery installation, expected performance, economics of working, cost-benefits, etc., for the prospective entrepreneurs to enable them to understand fully the procedures and implications of setting up a mini-sugar unit.

PB80-126519
(Order as PB80-126485, PC **A03/MF A01**)
National Marine Fisheries Service, Gloucester, MA.
The Economic Feasibility of Assuring U.S. Grade A Quality of Fresh Seafoods to the Consumer,
Carmine Gorga, John D. Kaylor, Joseph H. Carver, Joseph M. Mendelsohn, and Louis J. Ronsivalli. Jul 79, 9p NOAA-79102301-3
Included in Marine Fisheries Review, v41 n7 p20-27, Jul 79.

Results of a 2-year study demonstrated that, when the quality of fish fillets at the point of sale was of U.S. Grade A quality, benefits accrued to the consumer, the retailer, the processor, and potentially the fisherman. Sales tended to increase up to 20% and, at most, the extra cost to assure U.S. Grade A quality was 10 cents per pound. Since the high quality product commanded about 50 cents per pound more than its nonguaranteed counterpart, it is concluded that even if the estimated added cost is in large error, economic feasibility has been demonstrated.

PB80-131345
(Order as PB80-131238, PC **A10/MF A01**)
National Marine Fisheries Service, Kodiak, AK. Northwest and Alaska Fisheries Center.
Walleye Pollock, 'Theragra chalcogramma': Physical, Chemical, and Sensory Changes when held in Ice and in Carbon Dioxide Modified Refrigerated Seawater,
Kermit D. Reppond, Fern A. Bullard, and Jeff Collins. Apr 79, 9p NOAA-79102302-11

Included in Fishery Bulletin, v77 n2 p481-488 Apr 79.

Walleye pollock, Theragra chalcogramma, were held in the round in ice and in CO2 modified refrigerated seawater and periodically examined for physical and chemical changes as well as changes in the palatability of baked portions of blocks of fillets. Taste panel evaluation revealed that satisfactory fillets were obtained from fish that would have been judged spoiled if based on examination of the fish in the round. Sensory evaluation of baked fillet portions indicated that fish were acceptable for consumption to 6 days if heavily iced.

PB80-134794 PC **A03**/MF **A01**
New York State Dept. of Environmental Conservation, Albany. Div. of Marine Resources.
Operation of Mobile Laboratories for Shellfish Sanitation Control.
Completion rept. Apr 76-Mar 79,
James Redman. Dec 79, 38p NOAA-79121101

From April 1, 1976 through March 31, 1979, two mobile bacteriology laboratory vans, each equipped with a trailer-mounted boat and staffed with a Senior Laboratory Technician, were used to conduct sanitary examinations of shellfish lands and sanitary surveillance of shellfish processing plants in New York. Portions of two shellfish lands were demonstrated to have improved sanitary quality. Accordingly, the lands were recertified and thus made available for shellfish harvesting for use as food. Several incidents of pollution of shellfish lands were detected and monitored, including sewage treatment plant failures and a summer-long contamination of Fire Island Beaches with plastics, tar balls and grease balls. A program was developed to allow harvesting in occasionally polluted shellfish lands when the lands were pollution free. Two plants designed to microbiologically cleanse shellfish from uncertified shellfish lands were evaluated and subsequently licensed to operate.

6K. Life Support

AD-A078 493/4 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Annapolis MD Propulsion and Auxiliary Systems Dept
Development of Reverse Osmosis Desalination for Life Raft Emergency Drinking Water Supplies,
J. F. Pizzino, and W. L. Adamson. Dec 79, 29p
Rept no. DTNSRDC/PAS-79-31

Two hand-operated reverse osmosis desalinators being developed to provide emergency drinking water for life rafts were evaluated. Following some initial operating tests, the better performing unit, incorporating an energy recovery mechanism, was operated on a life raft in the open ocean by two Navy enlisted men for 7.5 hours. Each man alternately pumped the unit for up to 35 minutes each hour and produced better than 1 gallon-per-hour of drinking quality water. The tests demonstrated the feasibility of using such a device to provide emergency drinking water on a Navy life raft. (Author)

N80-14717/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Biological Systems for Human Life Support: Review of the Research in the USSR.
Y. Y. Shepelev. Dec 79, 26p NASA-TM-76018
Contract NASW-3198
Tran-Transl. Into English from Obzor. Issled. V Sssr, Inst. Of Med. And Biol. Problems, Ministry of Health (Moscow), 1979 p 1-24. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif. Conf-Presented at the 19TH Conf. Of the Joint Soviet-AM. Working Group on Space Biol. And Med., Houston, Tex., Oct. 1979.

Various models of biological human life support systems are surveyed. Biological structures, dimensions, and functional parameters of man-chlorella-microorganism models are described. Significant observations and the results obtained from these models are reported.

N80-14718/4 PC **A04**/MF **A01**
Life Systems, Inc., Cleveland, OH.
Regenerative CO2 Removal for PLSS Application.
Final Report.
D. B. Heppner, R. R. Woods, and F. H. Schubert. Oct 79, 64p NASA-CR-160419, LSI-TR-319-31-6
Contract NAS9-15218

Various concepts for the design of the nonelectrochemical absorber were defined and evaluated. A preliminary design based on the use of hollow fiber membranes was developed. Small scale bench testing demonstrated the carbon dioxide removal capability and provided design data for scale-up to the one person level. A full scale conceptual design of the absorbent regeneration hardware using six electrochemical cells was also completed. The design was supported by single cell testing and showed that a full scale regeneration system, operating continuously over 24 hours, can regenerate the absorbent from one extravehicular activity mission. The single cell regeneration hardware was operated for over 800 hours.

6L. Medical and Hospital Equipment

PAT-APPL-838 308 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Pasadena Office, CA.
Simultaneous Muscle Force and Displacement Transducer.
Patent Application,
C. Feldstein, G. W. Lewis, and V. H. Culler. Filed 30 Sep 77, 12p N80-12730/1, NASA-CASE-NPO-14212-1
Subm-Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A myocardial transducer for simultaneously measuring force and displacement within a very small area of myocardium is presented. Each branch of the forked transducer constitutes a low compliance tine for penetrating the heart. When the heart is penetrated, the surface membrane closes around indentations in the tines. A small piezoresistive element that converts a force into an electrical signal is bonded to one of the low compliance tines. A third high compliance tine is of a length that just pierces the surface membrane. Displacement of the myocardium in a direction in line with the two low compliance tines causes a deformation in curvature of the high compliance tine that is converted into an electrical signal by a second piezoresistive element. An electrode placed on the epicardium and referenced to the transducer provides an ECG with force and displacement measurements.

PB80-129430 PC **A03**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Loudness Balance Study of Selected Audiometer Earphones,
Kenneth C. Stewart, and Ernest J. Burgi. Dec 70, 46p PHS-PUB-1000-SER-2-40
Library of Congress catalog card no. 74-605821. Pub. as Vital and Health Statistics Ser-2-40.

The report contains the characteristics of three different configurations of Telephonics TDH-39 audiometer earphones and a newer design, the TDH-49 earphone, as determined by loudness balance on 12 human subjects. The TDH-39 earphones were ones used for determining auditory threshold in the Health Examination Surveys of 1960-1965. It also describes the equipment and general experimental design used in the study.

PB80-132798 Not available NTIS
National Bureau of Standards, Washington, DC.
New Initiator Systems for Dental Resins Based on Ascorbic Acid.
Final rept.,
J. M. Antonucci, C. L. Grams, and D. J. Termini. Sep 79, 13p
Contract PHS-Y01-DE-4001
Pub. in Jnl. of Dent. Res. 58, n9, p1887-1899, Sep 79.

Several promising initiator systems for the ambient polymerization of dental monomers were developed utilizing the oxidation-reduction reactions of certain organic peroxides and certain transition metal compounds with L(+) ascorbic acid and its derivatives.

PB80-804040 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Electrocardiography (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Dec 79,
Peter Moore. Jan 80, 61p
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations from the international literature provide descriptions of electrocardiographic case studies, instrumentation, modeling, measurements, telemetry computerization, and data analysis. A wide range of application electrocardiographic techniques is summarized in these abstracts, and correlations of the techniques of scalar-, vector-, echo-, angio-, and polarcardiography are discussed. (Contain 254 citations)

6M. Microbiology:

AD-A078 306/8 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Production of Exotoxin A by Pseudomonas Aeruginosa in a Chemically Defined Medium.
Medical research progress rept.,
Robert M. DeBell. 30 Jan 79, 10p Rept no. NMRI-79-65
Pub. in Infection and Immunity, v24 n1 p132-138 Apr 79.

No abstract available.

AD-A078 315/9 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Evaluation of Bactericidal Assay in Serotyping Neisseria Meningitidis Group A.
Medical research progress rept.,
Alice L. Quan, and John E. Sippel. 24 Apr 79, 5p
Rept no. NMRI-79-64
Pub. in Canadian Jnl. of Microbiology, v25 p929-931 1979.

No abstract available.

AD-A078 317/5 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Mouse Protective Capabilities of Escherichia coli Hybrids Expressing Salmonella typhi Antigens,
B. B. Diena, H. Lior, A. Ryan, E. M. Johnson, and L. S. Baron. 14 Sep 78, 5p
Pub. in Infection and Immunity, v24 n1 p90-93 Apr 79.

No abstract available.

AD-A078 732/5 PC **A04**/MF **A01**
Letterman Army Inst of Research San Francisco CA
Report of the 1977 Microbiological Data Collection Program.
Final rept. Jan-Dec 77,
John T. Fruin, William H. Langley, Jr., and Anne K. Regh. Oct 79, 63p Rept no. LAIR-77

This is the sixth and final in a series of reports which present the results of food microbiological testing (except fresh dairy products) performed by official Department of Defense Medical Laboratories, 1972-77. The program was designed and operated by the Department of Information Sciences, under the direction of the Food Hygiene Division, Letterman Army Institute of Research, utilizing in-house resources and the Lawrence Berkeley Laboratory computer facilities. A total of nearly 6500 samples were analyzed. Only a small percentage of the samples yielded potential pathogens. The data reported will be invaluable in the establishment of microbial standards for food items. (Author)

PB80-923000 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Oncology Overview: Cancer Virology/Immunology/Biology Series.
1980, approx. 10 issues

Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Single copies also available in paper or microfiche.

The overview series is a product of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each overview publication in this series contains abstracts of articles dealing with some specific topic concerned with virology. The purpose of these overviews is to facilitate and promote the exchange of information between cancer scientists. The material published in an overview is obtained from Cancerline, an online cancer information system. A subscriber to this series will receive approximately ten titles per year. These titles will then be updated either on a 12 or 24 month cycle.

PB80-929700 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cancer Virology.
Special listings.
1980, approx. 10 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Single copies also available in paper or microfiche.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Replication, synthesis, and related studies of DNA tumor viruses; Genetics of DNA tumor viruses; Broad programs on the replication and genetics of DNA tumor viruses; Other studies on the replication and genetics of DNA tumor viruses.

PB80-929701 PC **A04**/MF **A01**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Molecular Biology of DNA Tumor Viruses: Replication and Genetics.
Special listing.
4 Jan 80, 59p NCI/ICRDB/SL-320
Supersedes NTISUB/E/297-004.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Replication, synthesis, and related studies of DNA tumor viruses; Genetics of DNA tumor viruses; Broad programs on the replication and genetics of DNA tumor viruses; Other studies on the replication and genetics of DNA tumor viruses.

PB80-930300 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Virus Studies in Humans and Other Primates.
Cancergram CB04.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

All aspects of human and other primate (gibbon, ape, marmoset, chimpanzee, baboon, lemur, monkey) viruses of interest to cancer researchers are within the scope of this Cancergram. Only studies carried out in human and other primate cells will be included. Abstracts are included on identification, structure, classification, characterization, immunology, life cycle events, and possible and established etiological relationships to oncogenesis. Complementary to this series is Cancergram series CB11, DNA Tumor Viruses in Nonprimate Systems.

PB80-931000 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Viral Immunology.
Cancergram CB13.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

This Cancergram covers antigens identified with all viruses associated with cancer: both DNA and RNA viruses, in humans, other primates, and in subprimate species. The antigens may be expressed within infected cells, on cell surfaces, on free virus particles, or in cell-free fluids or extracts. Emphasis is placed on characterization of the antigens of particular viruses and viral components. Selected abstracts concerning the immune response of the host cell to viruses and viral antigens are also included.

60. Pharmacology

AD-A078 308/4 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Effects of Cocaine and d-Amphetamine on the Repeated Acquisition and Performance of Conditional Discriminations.
Medical research progress rept.,
Joseph M. Moerschbaecher, John J. Boren, John Schrot, and Jose Carlos Simoes Fontes. 23 Aug 77, 17p Rept no. NMRI-79-68
Pub. in Jnl. of the Experimental Analysis of Behavior, v31 n1 p127-140 Jan 79.

No abstract available.

AD-A078 313/4 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Effects of Methamphetamine and Scopolamine on Variability of Response Location.
Medical research progress rept.,
Joseph M. Moerschbaecher, Donald M. Thompson, and John R. Thomas. 6 Dec 78, 11p Rept no. NMRI-79-67
Pub. in Jnl. of the Experimental Analysis of Behavior, v32 n2 p255-263 Sep 79. Sponsored in part by Grant PHS-RR-05360.

No abstract available.

AD-A078 480 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Drug Interference with the Trihydroxyindole Method for Free Catecholamines in Urine.
Medical research progress rept.,
Leroy D. Mell, Jr., Anthony B. Gustafson, and Adolph R. Daslera. Sep 79, 21p Rept no. NMRI-79-51

Thirty-five of 108 drugs tested may interfere with the trihydroxyindole fluorometric method for urinary free catecholamines. Screening for interference was accomplished by testing the total daily dose of a drug or portion thereof for possible fluorescence. Further information was obtained by adding a similar dose for each of 16 interfering drugs to 150 ml of fresh, pooled urine containing 67 ng/ml each of norepinephrine and epinephrine. Additional studies of seven interfering drugs were conducted using healthy males and assaying catecholamines from 4-h urine specimens. Four possible modes of interference were observed: (1) substances which reacted to form fluorescent products, such as thiamine hydrochloride and ascorbic acid; (2) substances with native fluorescence, such as riboflavin; (3) substances which are intensely colored in solution and interfered with fluorescent excitation or emission spectra, such as phenazopyridine hydrochloride; and (4) substances which inhibited catecholamine extraction onto alumina, such as methenamine mandelate. This work has expanded upon data previously available in identifying drugs which may spuriously alter urinary free catecholamine excretion measured by the trihydroxyindole procedure. (Author)

AD-A078 811/7 PC **A15**/MF **A01**
Battelle Columbus Labs OH
Thesaurus for Pharmacological Literature of the U.S.S.R., East European Communist Countries, and People's Republic of China.
3rd Edition,
Ruth M. Linebaugh. 25 Jun 75, 338p USAMIIA-1-75
Contract DAMD17-75-C-5012
Updates and supersedes all previous editions.

Among the features of this third edition of the thesaurus are: (1) Listing of new or not previously listed pharmaceuticals from the above countries. (2) Listing of new uses for previously identified pharmaceuticals. It should be noted that pharmaceutical usages as indicated in this thesaurus are those indicated in the literature of the countries involved, and do not necessarily coincide with US usage of the same compound. (3) Listing of country of origin of both new and previously identified pharmaceuticals whenever possible. The country of origin of the article in which the compound was mentioned is not presumed to be the country in which the compound is marketed under that name. Therefore, many compounds do not have a country of origin listed. (4) Listing of synonymous names for both new and previously identified pharmaceuticals. In accomplishing this objective two methods have been utilized. In some instances the literature specifically states that two compounds are synonymous. In addition, compounds synonymous to the same compound are considered synonymous to each other. Compounds with the same name but with different chemical formulas are listed as separate pharmaceuticals. (5) Identification of 'drugs of choice' in the USSR.

PB80-134414 PC **A12**/MF **A01**
Food and Drug Administration, Rockville, MD. Bureau of Drugs.
FDA Interim Index to Evaluations Published in the Federal Register for NAS-NRC Reviewed Prescription Drugs. Volume IX, Cumulative up to January 1, 1980.
1 Jan 80, 264p
Supersedes PB-284 354.

The publication is a cumulative index of FEDERAL REGISTER notices announcing the efficacy classifications to over 3,500 prescription drug formulations marketed prior to 1962.

PB80-932200 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Antitumor and Antiviral Agents: Mechanisms of Action.
Cancergram CB19.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

The Cancergram concerns preclinical studies of any drugs and agents that have, or are being tested for, antitumor, antimetastatic, and/or antiviral properties, either in vivo or in vitro. The scope centers on the mechanism of action of the drugs (structure-activity relationships, effects exerted at the cellular or subcellular level), their metabolism (including transport, binding, and conversion), and physical and chemical analysis, characterization, and synthesis of the agents. Studies involving human patients are excluded. Studies concerning toxicity, pharmacokinetics, and efficacy of antitumor and antiviral agents are generally excluded unless they stress, or are coupled with, aspects listed above as in scope. These excluded areas are covered by Cancergram CB20, entitled Antitumor and Antiviral Agents--Experimental Therapeutics, Toxicology, Pharmacology.

PB80-932300 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Antitumor and Antiviral Agents: Experimental Therapeutics, Toxicology, Pharmacology.
Cancergram CB20.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

This Cancergram concentrates on the effectiveness of chemical agents and preparations in controlling tumor growth, metastasis, and viruses associated with tumors. These agents include substances undergoing initial testing for efficacy as well as established antitumor drugs currently being used in new treatment regimens. The Cancergram covers in vivo and in vitro testing of animals and animal cell lines, and in vitro exposure of human cell lines to these agents. In keeping with the preclinical orientation of this Cancergram, studies involving the administration of drugs to patients for

the establishment of clinical treatment protocols are excluded. Emphasis is placed on dose-response and biological activity studies, establishment of lethal and toxic dose levels, the comparative toxicity and efficacy of agents used independently, and the potentiating or antagonistic interactions of agents used in combination. Biochemical and physiological aspects of the actions and metabolism of antitumor agents are not in scope; these topics are covered in Cancergram CB19, entitled Antitumor and Antiviral Agents--Mechanisms of Action.

6P. Physiology

N80-14688/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Prolonged Hypokinesia on Tissue Blood Flow.
Z. P. Levites, and V. F. Fedotova. Dec 79, 7p
NASA-TM-76005
Contract NASW-3198
Tran-Transl. Into English from Eksp. Khir. Anesteziol. (Ussr) No. 3, May/Jun. 1974 p 79-80. Subm-Transl. By Scientific Translation Service Santa Barbara, Calif.

The influence of hypokinesia on the blood flow in the tissues of rabbits was studied. Motor activity of animals was restricted during 90 days and blood flow recorded through resorption rate of NaI-131. Perfusion of tissues under the influence of hypokinesia was found to be reduced.

6Q. Protective Equipment

AD-A078 681/4 PC **A03**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Feasibility Testing of a Body Inflatable Bladder (BIB) Restraint Device.
Phase rept.,
Marcus Schwartz. 10 Apr 79, 42p Rept no. NADC-79241-60

A feasibility model of an inflatable type restraint system was designed and developed for use with existing operational restraint hardware to improve crewman safety during ejection. The vest type inflatable system is worn over the flight suit and under the MA-2 integrated torso harness. Upon inflation, the crewman is forced back into the suit while slack is removed from the harness. Subsequent ejection tower testing has demonstrated significant reductions in horizontal head and torso response during the catapult phase of the ejection. (Author)

6R. Radiobiology

AD-A078 554/3 PC **A07**/MF **A01**
Joint Task Force Seven Washington DC
Operation SANDSTONE, Nuclear Explosions. Scientific Director's Report of Atomic Weapon Tests. Annex 10. Radiological Safety Instruments.
Sandstone rept. no. 31.
1948, 145p
See also Annex 17, Parts 2 and 3, AD-A078 550.

Task Group 7.6, with assigned responsibilities for radiological health protection during Operation Sandstone, conducted certain tests and made observations on field performance of a number of miscellaneous instruments including Geiger-Mueller survey instruments, ionization chamber survey instruments, and integrating dosimeters. This report contains observations on the numbers and types of instruments required for operations of a similar nature to Operation Sandstone. Certain design defects are noted in the instruments used, and some corrective recommendations are made. In general, the performance of the instruments used during the operation was good. Serious leakage problems were encountered with pocket dosimeters. Some troubles were encountered in the use of instruments in aircraft. Information is given in Appendix B on the processing of film badges used for health protection. (Author)

AD-A078 935/4 PC **A03**/MF **A01**
Franklin Research Center Philadelphia PA Science Information Services Organization
Biological Effects of Nonionizing Electromagnetic Radiation. Volume IV. Number II.
Quarterly rept. Sep-Dec 79,
Bruce H. Kleinstein, and Sheryl A. Dyner. Dec 79, 50p Rept no. 80G-C5003-01-VOL-4-2
Contract HO-A01-78-1157
A digest of current literature. See also Volume 4, Number 1, AD-A075 253.

This quarterly digest presents current awareness information on the biological effects of nonionizing electromagnetic radiation (microwave and radio frequency) in the range of 0 Hz to 100 GHz. The effects of magnetic and electric fields (Static and alternating) are also covered. Each issue contains abstracts of English and foreign current literature, summaries of ongoing research investigations, news items, and a directory of meetings and conferences.

6S. Stress Physiology

AD-A078 307/6 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Cross-Adaptive Effects of Cold, Hypoxia, or Physical Training on Decompression Sickness in Mice.
Medical research progress rept.,
Barnett A. Rattner, Steven P. Gruenau, and Paul D. Altland. 5 Feb 79, 9p Rept no. NMRI-79-66
Pub. in Jnl. of Applied Physiology, Respiratory Environmental Exercise Physiology, v47 n2 p412-417 1979.

No abstract available.

AD-A078 311/8 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Adrenal Function and the Incidence of Bends after Decompression in Mice: Effect of Adrenalectomy, Corticosteroids, Decompression Intensity, and Time of Day.
Medical research progress rept.,
B. A. Rattner, and S. P. Gruenau. Nov 78, 15p
Pub. in Undersea Biomedical Research, v6 n2 p155-166 Jun 79.

No abstract available.

AD-A078 319/1 PC **A04**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
Survey of Methods to Assess Workload,
Bryce O. Hartman, and Richard E. McKenzie. Aug 79, 61p Rept no. AGARD-AG-246
See also Rept. no. AGARD-AR-139.

Contents: Concepts of Workload; concepts of Fatigue; Concepts of Stress; Some Considerations Concerning Methods to Evaluate and Assess Workload in Aircraft Pilots; Physiologic Aspects of Workload/Fatigue/Stress; Some Insights Relative to the Man-Machine System--an Overview of Ten Years of Research; Aircrew Workload Assessment Techniques; Workload Assessment Methodology Development; Quantitative Military Workload Analysis; visual Performance--A Method to Assess Workload in the Flight Environment; Handling Qualities, Workload, and Heart Rate; Brain Waves and the Enhancement of Pilot Performance; Pupillometric Methods of Workload Evaluation: Present Status and Future Possibilities; Aircrew Performance Research Opportunities Using the Air Combat Maneuvering Range (ACMR); Speech Patterns and Aircrew Workload; An Exploratory Study of Psychophysiological Measurement as Indicators of Air Traffic Control Sector Workload; Individual and System Performance Indices for the Air Traffic Control System; Workload and Stress in Air Traffic Controllers; and Assessment Correlates of Workload and Performance.

AD-A078 321/7 PC **A04**/MF **A01**
Naval Arctic Research Lab Barrow AK
NARL Animal Research Facility. Annual Report for FY78.
Technical rept.,
Gary A. Laursen, and George M. Selby. 1978, 51p Rept no. TR-2

The NARL Animal Research Facility is completing its fourth year of support from the Office of Naval Research Biophysics Program. The Animal Research Facility has provided scientists with unique opportunities to study northern animals maintained in an arctic environment. The Research animals live year round in outdoor cages where they are subjected to the temperature and light conditions found only in the arctic. This report documents the activities and accomplishments of the facility during FY78. (Author)

AD-A078 343/1 PC **A02**/MF **A01**
Naval Submarine Medical Research Lab Groton CT
Pulmonary Function during Shallow Habitat Air Dives (SHAD I, II, III),
J. H. Dougherty, Jr., R. L. Frayre, D. A. Miller, and K. E. Schaefer. 1979, 15p Rept no. NSMRL-911
Pub. in Underwater Physiology, v6 p193-204 1979.

No abstract available.

AD-A078 385/2 PC **A02**/MF **A01**
Army Research Inst of Environmental Medicine Natick MA
Food Intake and Energy Expenditures in Cold Weather Military Training,
James E. McCarroll, R. F. Goldman, and Joseph C. Denniston. 1979, 10p Rept no. USARIEM-M-26/78
Pub. in Military Medicine, v144 n9 p606-610 Sep 79.

No abstract available.

AD-A078 491/8 PC **A02**/MF **A01**
Flying Personnel Research Committee London (England)
Cockpit Thermal Stress and Aircrew Thermal Strain During Routine Jaguar Operations,
T. M. Gibson, L. A. Cochrane, M. H. Harrison, and P. W. Rigden. Mar 79, 23p Rept no. FPRC-1376

Thermal data have been obtained from Jaguar aircraft flying routine, warm weather operations in Sardinia. These data have been analysed in terms of the ambient and cockpit wet bulb, globe temperatures (WBGT) and the mean body temperature (Tb) of the pilot. In contrast to similar data previously obtained from Harrier and Buccaneer aircraft, no inter-relationships could be demonstrated between ambient WBGT at ground level and either cockpit WBGT or pilot Tb. Relationships, which could be described by equations of negative slope, were obtained between Tb and sortie time and between cockpit WBGT and sortie time. A model has been derived for predicting aircrew thermal strain in the Jaguar from cockpit temperature and sortie time. (Author)

AD-A078 647/5 PC **A04**/MF **A01**
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Diving Computer Operational Envelope Proving Protocol Phase I. XDC-2 Validation Dives 0-54 MSW June/July 1979.
Technical communication rept.,
M. D. Kooner, and B. A. Ridgewell. Jul 79, 58p Rept no. DCIEM-TC-79C33

The aim of this series of dives is to determine the operational envelope of the XDC-2 Decompression Computer using air to a maximum simulated depth of 54 metres of sea water. The objective is to evaluate the XDC-2 for operational diving, to determine whether the safe depth as displayed can be followed exactly for safe decompression, and to define the operational limits for it use. The basic dive profile is descent at 18 metres of seawater (msw) per minute to depth, remaining at that depth for the required time; initial ascent is at 18 msw/min. to the calculated safe depth, continuous ascent following the safe depth to 3 msw, a stop at 3 msw until the computer indicates that surfacing is possible, and then ascent to the surface. See Article 6.1 and Annex D and E for more detailed information with respect to ascent and descent times.

AD-A078 664/0 PC **A03**/MF **A01**
Human Engineering Lab Aberdeen Proving Ground MD
Effects of Artillery Noise on the Hearing of Protected Crew Personnel.
Final rept. May-Jun 78,

David C. Hodge, G. Richard Price, Nancy L. Dukes, and Samuel J. Murff. Oct 79, 39p Rept no. HEL-TM-17-79
See also Rept. no. HEL-TM-9-79, AD-A073 742.

A test was conducted to determine loading rates for three artillery systems, and both male and female crews participated. Audiometric and acoustical support were provided to assess the crews' noise exposure, look for trends in the threshold shift data, and compare the threshold shifts with that permitted under present damage risk criteria. The impulse noise exposures were quite variable, due to crew mobility and low zone charges. There were no instances of excessive threshold shift, and only a few instances of threshold shift approaching the allowable limits. There were no obvious trends across test conditions. The main auditory goal of the test, viz., to avoid excessive hearing losses, was achieved. (Author)

AD-A078 723/4 PC **A02**/MF **A01**
Army Research Inst of Environmental Medicine Natick MA
Increased Survival in Experimental Dog Heatstroke after Reduction of Gut Flora,
G. Bynum, J. Brown, D. Dubose, M. Marsili, and I. Leav. 1979, 9p Rept no. USARIEM-M-17/79
Pub. in Aviation, Space, and Environmental Medicine, v50 n8 p816-819 Aug 79.

No abstract available.

AD-A078 761/4 PC **A02**/MF **A01**
Army Research Inst of Environmental Medicine Natick MA
Hypothermia Induced by Chlorpromazine or L-Tryptophan: Effects on Treadmill Performance in the Heat,
Ralph P. Francesconi, and Milton Mager. 18 Apr 79, 10p Rept no. USARIEM-M-8/79
Pub. in Jnl. of Applied Physiology: Respiratory, Environmental and Exercise Physiology, v47 n4 p813-817 1979. Supersedes report dated 28 Mar 79, AD-A069 849.

No abstract available.

N80-14671/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Micromorphology of Neurohypophysis of Rats under Experimental Conditions.
E. R. Meitner, and E. Proksova. Dec 79, 7p NASA-TM-75947
Contract NASW-3198
Tran-Transl. Into English from Biologia (Bratislava), V. 25, No. 12, 1970 p 857-860. Subm-Transl. By Scitran, Santa Barbara, Calif.

The changes of the quantity of neurosecretory substance in neurohypophysis of rats under various experimental conditions are investigated. Comparing to the norm the quantity of neurosecretion after a long stay in the dark was larger. In animals subjected to immobilization stress the picture of neurohypophysis remained unchanged. It changed only in correlation with the administered water. Results indicate that the immobilization stress, in contradistinction to dolorose stress, has no substantial influence upon the quantity of neurosecretion in neurohypophysis.

N80-14716/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Simulation of Physiological Systems in Order to Evaluate and Predict the Human Condition in a Space Flight.
V. V. Verigo. Dec 79, 26p NASA-TM-76016
Contract NASW-3198
Tran-Transl. Into English of Conf. Paper from Inst. Of Med. And Biol. Problems, Min. Of Health USSR Moscow, 1979 p 1-23. Conf-Presented at the 10TH Conf. Of the Joint Soviet-AM. Working Group on Space Biol. And Med., Houston, Tex., Oct. 1979.

Simulation models were used to study theoretical problems of space biology and medicine. The reaction and adaptation of the main physiological systems to the complex effects of space flight were investigated. Mathematical models were discussed in terms of their significance in the selection of the structure and design of biological life support systems.

6T. Toxicology

AD-A078 527/9 PC **A03**/MF **A01**
Science Spectrum Inc Santa Barbara CA
A Biological Waste Water Monitor Study Using Differential Laser Light Scattering from Bacteria.
Final rept. 15 Aug 78-14 Aug 79,
Philip J. Wyatt. Oct 79, 41p SSI-2015-F, AFOSR-TR-79-1278
Contract F49620-78-C-0096

A ninety-minute bioassay of selected toxicants (monomethylhydrazine, dimethylhydrazine, nitrosodimethylamine, JP4, and JP8) in water has been confirmed. The method consists of measuring the differential light scattering (DLS) patterns of exponential phase bacterial suspensions in water containing the selected toxicant relative to a toxicant-free control suspension. The suspensions are illuminated by a fine laser beam and the light scattered as a function of angle with respect to the incident beam is recorded (the DLS pattern). Relative to the bacteria in the control, toxicant-free, suspension, bacteria affected by the toxicants may change their shape, average size, size distribution, and/or number density. Any such changes will in general result in a changed DLS pattern relative to that of the control. The measurement of such differences forms the basis for the present bioassay technique. The bacterial suspensions are usually prepared from a bacterial chemostat source driven by paristaltic pumps of a Technicon manifold. Throughout an 8 hour sampling period cultures will generally not vary by more than 20% in number density and negligibly in morphology. Within the ninety minute assay period, number density variations are less than 5%.

AD-A078 585/7 PC **A03**/MF **A01**
Pittsburgh Univ PA Dept of Metallurgical and Materials Engineering
Toxicity of the Degradation Products from Polyphosphazene Copolymers. Part IV.
Interim technical rept.,
P. J. Lieu, J. H. Magill, and Y. C. Alarie. 10 Dec 79, 31p Rept no. SETEC-MME-79-62
Contract N00014-77-C-0310

Polyphosphazene copolymers have been degraded under dynamic air flow up to temperatures of 700 degrees C at a heating rate of 35 degree per minute. A few experiments were also conducted up to 1000 degrees C. Animal inhalation screening tests with mice (Swiss Webster) were made under these test conditions. An air flow rate of 20 l/min was employed in the toxicological studies where the temperature in the animal chamber was always held below 45 degrees C, a condition which did not adversely affect the animals under test. Simultaneously, thermogravimetric measurements were made on decomposing polyphosphazenes in order to assess the rate of sample decomposition at different temperatures. Quantitative analytical measurements of the evolution of HCN and CO gases from the polymers (some without fillers) were made under identical thermal and environmental conditions. The results clearly show that there is not a significant correlation between CO-evolved and the induced toxicity in these animals. A similar conclusion follows for the evolution of HCN gas. Correlation with both these gaseous products indicates that other more lethal products may be responsible for the observed LC50 results. The complexity of the decomposition products has not yet been elucidated, but it has been demonstrated clearly that an animal test model properly applied can be used to screen complex polymeric systems. (Author)

AD-A078 746/5 PC **A11**/MF **A01**
Midwest Research Inst Kansas City MO
Mammalian Toxicity of Munitions Compounds Phase III: Effects of Life-Time Exposure Part II: Trinitroglycerin.
Progress rept. no. 8, 1 Oct 75-30 Sep 78,
Harry V. Ellis, III, Jack H. Hagensen, John R. Hodgson, Jan L. Minor, and Chuen-Bin Hong. Nov 78, 247p
Contract DAMD17-74-C-4073
See also Phase 3, Part 1, AD-A077 692.

The effects of oral doses of trinitroglycerin (TNG) after oral administration for up to 24 months were studied in dogs, rats and mice. Ancillary studies included cytogenetic analysis, three generation reproduction, dominant lethal mutation and metabolism studies in rats. In dogs, 1, 5, or 25 mg/kg/day by capsule for 12 months produced a little, dose-related, transient methemoglobinemia. In rats, 3.04 or 3.99 mg/kg/day in feed for males or females, respectively, had no apparent effects, 31.5 or 38.1 mg/kg/day had some hepatotoxic effects and 363 or 434 mg/kg/day was highly toxic, but not lethal. In mice, up to 115 or 96 mg/kg/day had no effect, while 1,020 or 1,060 mg/kg/day was toxic. TNG caused some non-specific effects on weight gain, feed consumption and behavior. Target organs included the blood (methemoglobinemia with compensated anemia and pigment deposits in rodents), liver (cholangiofibrosis and hepatocellular carcinoma in rats) and testis (increased interstitial tissue and interstitial cell tumors in rats). No direct effects were seen in the ancillary studies. From these data the concentration of TNG in ambient water which would produce in man a risk in 1 in 100,000 of developing a tumor after lifetime exposure was estimated as 28.9 microgram/liter. (Author)

AD-A078 933/9 PC **A04**/MF **A01**
California Univ Irvine
The Effect of Designated Pollutants on Plants.
Annual rept. no. 4, 1 Jul 78-30 Jun 79,
A. L. Granett, and O. C. Taylor. Dec 79, 65p AMRL-TR-79-73
Contract F33615-76-C-5005

The phototoxicity of hydrogen chloride (HCl) gas was studied with particular emphasis on various external plant stresses. Greenhouse grown plants and indoor exposure chambers were utilized to test the effect of viral infection, insecticide treatment, weed killer applications, or antioxidant protectants on injury caused by HCl gas. Plant sensitivity did not differ between virus-infected and non-viral plants. Increased injury, however, was seen on plants exposed to HCl gas after one of the insecticide treatments. An experimental antioxidant compound which protects plants from ozone injury did not increase tolerance to HCl gas. Since greenhouse conditions eliminate many natural stresses, HCl exposures were conducted in field plots both in Riverside and at Vandenberg Air Force base, California. Some plants were fumigated only once while others received weekly doses. Field plants were generally more tolerant than the same species grown in the greenhouse. Further, plants exposed at Vandenberg were more sensitive than those at Riverside. Of the plants tested, a native species at Vandenberg was most resistant to HCl. HCl for the field work was generated either by diluting pressurized dry gas in a large volume of flowing carrier gas or by open-burning of small pieces of solid rocket fuel. Portable chambers remained over the field plants only for the duration of the 15-minute exposures. HF gas is considerably more phytotoxic than HCl. Work with this pollutant was limited to a review of the literature and an experiment on the uptake of fluoride salts through the roots. (Author)

PB80-935100 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Chemical Carcinogenesis: Nitroso Compounds.
Cancergram CK01.
1980, approx. 12 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies PC E01/each issue.

This agent-oriented Cancergram covers all information on nitroso compounds that might be relevant to research on the carcinogenicity of these compounds, or to judgments concerning the possible public hazards of these compounds or their precursors. Abstracts included concern induction of neoplasms by nitroso compounds; formation, biochemistry, cellular effects, and mutagenicity of nitroso compounds; reviews including nitroso compounds; and analytical methods for nitroso compounds. The Cancergram generally excludes all material on the properties of the nitrosoures compounds used in cancer therapy.

7. CHEMISTRY

7A. Chemical Engineering

PATENT-4 177 227 Not available NTIS
Department of the Air Force Washington DC
Low Shear Mixing Process for the Manufacture of Solid Propellants.
Patent,
Kenneth L. Harvey, and Howard D. Dixon. Filed 10 Sep 75, patented 4 Dec 79, 14p AD-D006 804/9, PAT-APPL-612 435
Supersedes PAT-APPL-612 435, AD-D006 083.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A low shear mixing process for preparing high solids, high viscosity rocket propellants in which the propellant ingredients are blended with an inert diluent to reduce the high shear mixing environment generated by conventional mixing techniques. The diluent is then removed by sublimation from the mixture through a freeze drying process prior to curing and casting the mix according to conventional techniques. (Author)

PB80-125297 PC **A05/MF A01**
Foremost McKesson, Inc., Dublin, CA.
Wine Production from Cheese Whey.
Final rept. Oct 75-Jun 78,
Gaylord M. Palmer. Oct 79, 77p EPA/600/2-79-189
Grant EPA-S-803863

The objective of this project was to demonstrate commercial feasibility of producing an alcoholic beverage by wine yeast fermentation of supplemented cheese and cottage cheese wheys. Results indicated that the preferred processing route was (1) fractionation of the whey into protein concentrate and permeate by ultrafiltration; (2) supplementation of permeate with twenty two percent dextrose on the permeate weight; (3) fermentation in stirred fermentors for seven to ten days at 20-22C; (4) clarification of the ferment by centrifugal means followed by pressure filtration; (5) demineralization of the ferment by ion exchange; (6) formulation of the beverage by addition of natural fruit flavor concentrates, invert syrups, malic acid, and water to standardize alcohol content at about eight percent by volume; (7) polishing filtration through diatomaceous earth and a 0.45 micron membrane filter; (8) carbonation with two volumes of carbon dioxide and (9) bottling with a pressure retaining cap.

PB80-125719 PC **A02/MF A01**
Pakistan Council of Scientific and Industrial Research, Karachi.
Utilization of - I. Molasses Distillery Stillage. II. Press Mud,
M. Aslam, and A. H. Khan. May 79, 21p

The report attempts to identify all the options that are available for the utilization of Molasses Distillery Stillage and Press Mud (Cane sugar manufacture by the carbonation process leads to theproduction of up to 8% of press mud on the basis of weight of the care crushed). Spent Wash is a good energy source for microorganisms and has been exploited for the cultivation of fodder yeast, mucelial fungi and mushroom mycellia, in many countries. On account of different plant operations and composition of molasses, stillage from various distilleries varies in composition. Therefore, in order to use any stillage for biomass production, an assessment of its potential as a substrate for fermentation is described.

7B. Inorganic Chemistry

PATENT-4 177 230 Not available NTIS
Department of the Air Force Washington DC
Process for Producing Reaction Sintered Silicon Nitride of Increased Density.
Patent,
Khodabakhsh S. Mazdiyasni. Filed 2 Jun 78, patented 4 Dec 79, 5p AD-D006 803/1, PAT-APPL-911 746
Supersedes PAT-APPL-911 746-78, AD-D005 127.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Porous reaction sintered silicon nitride body is infiltrated with an organosilicon compound after which the body is heated at a temperature sufficient to decompose the infiltrated material, resulting in a silicon nitride body having an increased density and significantly improved room temperature strength. (Author)

7C. Organic Chemistry

AD-A078 293/8 PC **A04/MF A01**
University of Southern California Los Angeles Dept of Chemistry
Organosilicon Chemistry.
Final scientific rept. 1 Oct 76-30 Sep 79,
William P. Weber. 30 Sep 79, 67p AFOSR-TR-79-1233
Grant AFOSR-77-3123

The following studies are summarized: (a) several aspects of the chemistry of polysilane-polysulfides (b) the photochemical generation of silicon-oxygen doubly bonded intermediates and the study of the insertion of these intermediates into Si-O single bonds of siloxanes, (c) novel reactions of silylenes, (d) the mass spectral fragmentation patterns of several classes of aryl substituted disiloxanes, (e) generation of dichlorocarbene under phase transfer catalysis conditions, and (f) gas phase vacuum pyrolysis of several five membered heterocyclic-1,2-butadienes.

AD-A078 680/6 PC **A02/MF A01**
Oklahoma Univ Norman Dept of Chemistry
Diorganostyryltinchloride.
Technical rept.,
H. Schumann, G. Rodewald, U. Rodewald, J. L. Lefferts, and J. J. Zuckerman. 26 Nov 79, 25p Rept no. TR-16
Contract N00014-77-C-0432
Text in German. Prepared in cooperation with Berlin Univ. (Germany, F.R.). Inst. fuer Anorganische und Analytische Chemie der Technischen.

Diorganotin dichlorides R2SnC1 (R = CH3, C4H9, C6H5, p-CH3C6H4) and 1,1-dichloro-1-stannacyclohexane react with the p-styryl Grignard reagent to form mixtures containing the tetraorganotin compounds R2Sty2Sn and diorgano-styryltin chlorides which can be separated by column chromatography and characterized by i.r., n.m.r., Mossbauer and mass spectrocopy. (Author)

AD-A078 700/2 PC **A03/MF A01**
Brandeis Univ Waltham MA Dept of Chemistry
Preparation and Molecular Structure of TaH(P(C6H5)2)2(Me2PC2H4Me2)2, a Metal Hydride of the type MHL2(Bidentate Phosphine)2(n+), Having a Pentagonal Bipyramidal Structure.
Interim rept.,
P. J. Domaille, Bruce M. Foxman, T. J. McNeese, and S. S. Wreford. 1 Dec 79, 45p Rept no. TR-6
Contract N00014-76-C-0822

Treatment of TaCl2(dmpe)2 (dmpe = 1,2-bis(dimethylphosphino)ethane) with K(PPh2).2 dioxane affords a seven-coordinate, Ta(III) hydride, TaH(PPh2)2)-(dmpe)2. Crystals of the complex are triclinic, space group P1, with a = 10.556(3) Angstrom, b = 11.175(3) Angstrom, c = 18.663(5) Angstrom, alpha = 76.00(3) deg, beta = 74.48(3) deg, gamma = 66.60(3) deg. Full-matrix least squares refinement of positional and thermal parameters for all nonhydrogen atoms (including fixed contributions for phenyl H atoms) led to R = 0.077 and R (omega) = 0.093. The molecular structure of the complex consists of a well-defined pentagonal bipyramid, with apical, monodentate PPh2 moieties, and two dmpe ligands plus a hydride ion in the pentagonal plane. The hydride ion was not refined, but its position was inferred from a peak on a final difference map, as well as from large P-Ta-P angle distortions in the pentagonal plane. (Author)

PAT-APPL-6-054 926 PC **A02/MF A01**
Department of Health, Education, and Welfare, Washington, DC.
A Cobalt-Catalyzed One-Step Synthesis of Annulated Pyridines and Novel Products.
Patent Application,
K. Peter C. Vollhardt, and Alaric Naiman. Filed 5 Jul 79, 10p PB80-128267
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method is given for synthesizing fused ring pyridines (annulated) by co-oligomerization of alpha, omega-diynes with about molar equivalents of nitriles, using a Co(+1) catalyst, preferably cyclopentadienyl cobalt dicarbonyl.

PATENT-4 174 300 Not available NTIS
Department of Agriculture, Washington, DC.
Preparation of Highly Active Copper-Silica Catalysts.
Patent,
Sambasivarao Koritala. Filed 30 Jan 78, patented 13 Nov 79, 4p PB80-130578, PAT-APPL-873 572
Supersedes PB-279 289.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Highly active and selective linolenate-reducing, copper catalysts are prepared by vacuum drying copper-silica coprecipitates, and then activating the precipitates by heat treatment. The resultant catalysts are characterized by activities 2-3.5 times those of commercial copper chromites and also possess comparable linolenate selectivities.

PB80-804362 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
The Chemistry of Silicone Resins. Volume 1. 1964-1976 (Citations from the NTIS Data Base).
Rept. for 1964-76,
Diane M. Cavagnaro. Feb 80, 184p

This bibliography pertains to the synthesis, polymerization, and chemical reactions of silicone and silicon-containing polymers and copolymers. The citations discuss grafting and crosslinking reactions, radiation polymerization, and spectra and molecular structure as they relate to their properties. (This updated bibliography contains 177 abstracts, none of which are new entries to the previous edition.)

PB80-804370 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
The Chemistry of Silicone Resins. Volume 2. 1977-January, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-Jan 80,
Diane M. Cavagnaro. Feb 80, 68p
Supersedes NTIS/PS-79/0015, NTIS/PS-78/0050, and NTIS/PS-77/0063. See also Volume 1, 1964-1977, PB80-804362.

The synthesis, polymerization, and chemical reactions of silicone and silicon-containing polymers and copolymers are considered in tnese citations of Federally funded research. Topics include grafting and crosslinking reactions, radiation polymerization, and spectra and molecular structure as they relate to properties. (This updated bibliography contains 61 abstracts, 14 of which are new entries to the previous edition.)

7D. Physical Chemistry

AD-A078 310/0 PC **A02/MF A01**
Naval Medical Research Inst Bethesda MD
Methyldopa as an Internal Standard for Catecholamine Analysis by Use of High-Performance Liquid Chromatography.
Medical research progress rept.,
Leroy D. Mell, Jr., and Anthony B. Gustafson. 1978, 3p Rept no. NMRI-78-104
Pub. in Clinical Chemistry, v24 n7 p1290 1978.

No abstract available.

AD-A078 318/3 PC **A02/MF A01**
Naval Medical Research Inst Bethesda MD
Energy and Entropy Relations in Highly Polar Liquids. Electrostatic Approximations Using the Onsager Model.
Medical research progress rept.,

William H. Bishop. 18 Oct 78, 10p Rept no. NMRI-79-63
Pub. in Jnl. of Physical Chemistry, v83 n18 p2338-2344 1979.

No abstract available.

AD-A078 378/7 PC **A02/MF A01**
Illinois Univ At Urbana-Champaign Dept of Chemistry
Ozonolysis of Diphenylvinylene Carbonate. The Synthesis and Thermolysis of Dibenzoyl-mono-peroxycarbonate.
Technical rept.,
Gary B. Schuster, and John R. Hurst. 6 Dec 79, 15p Rept no. TR-22
Contract N00014-76-C-0745

Dibenzoylmonoperoxycarbonate (I) was prepared by the reaction of diphenylvinylene carbonate with ozone. The thermolysis of I in benzene gives products typical of the formation of benzoyloxy radicals. The reaction rate was investigated at different temperatures and the activation parameters were determined (delta H = 27.8 + or - 1.2 kcal/mol, delta S =6.1 + or - 3.5 eu). The thermolysis of I in the presence of the stable free radical galvinoyl was investigated also. These experiments revealed that the fraction of radical escape from the solvent cage is 60 + or - 5%.

AD-A078 379/5 PC **A03/MF A01**
Illinois Univ At Urbana-Champaign Dept of Chemistry
Electron Transfer Initiated Reactions of Organic Peroxides. The Reaction of Phthaloyl Peroxide with Olefins and Other Electron Donors.
Technical rept.,
Gary B. Schuster, Joseph J. Zupancic, and Keith A. Horn. 6 Dec 79, 38p
Contract N00014-76-C-0745

The reaction of phthaloyl with a variety of compounds capable of reacting as one or two electron donors was investigated. The products and the kinetics of these reactions indicate that the rate-limiting step is the transfer of one electron from the reactant to the peroxide. This conclusion was substantiated by investigating these reactions by laser flash photolysis. This study showed conclusively that odd electron intermediates are formed in the reaction of phthaloyl peroxide with ground and excited state electron donors. These reactions may be prototypical of a general class of transfer initiated transformations. (Author)

AD-A078 381/1 PC **A02/MF A01**
Virginia Univ Charlottesville Dept of Chemistry
Charge-Transfer Luminescence from a Nonaromatic Alpha-Diimine Complex of Ruthenium (II),
William P. Krug, and J. N. Demus. 12 Feb 79, 4p AFOSR-TR-79-1088
Grants AFOSR-78-3590, NSF-CHE77-20379
Sponsored in part by Grant NSF-CHE77-09296.
Pub. in Jnl. of the American Chemical Society, v101 n15 p4394-4396, 18 Jul 79.

No abstract available.

AD-A078 388/6 Not available NTIS
Texas A and M Univ College Station Dept of Oceanography
Equilibrium Solubilities of Methane, Carbon Monoxide, and Hydrogen in Water and Sea Water,
Denis A. Wiesenberg, and Norman L. Guinasso, Jr. 25 Sep 78, 5p
Contract N00014-75-C-0537, Grant NSF-OCE77-21009
Sponsored in part by Grant NSF-OCE75-21275.
Availability: Pub. in Jnl. of Chemical and Engineering Data, v24 n4 p356-360 Oct 79 (No copies furnished by DTIC).

No abstract available.

AD-A078 425/6 PC **A02/MF A01**
Air Force Materials Lab Wright-Patterson AFB OH
ISS/SIMS Characterization of UV/O3 Cleaned Surfaces.
Final rept. Jul 78-Aug 79,
W. L. Baun. Oct 79, 24p Rept no. AFML-TR-79-4136

When solids are irradiated with ultraviolet light from a low pressure mercury discharge tube (UV/03), a complex reaction involving interaction of both photons and ozone produces a cleaning action on the surface. In this work, the efficiency of the UV/O3 method is evaluated using ISS and SIMS. The UV/O3 method is found to be useful for both surface cleaning and storage following cleaning by conventional techniques. (Author)

AD-A078 447/0 PC **A02/MF A01**
Texas Univ At Austin Dept of Chemistry
An Ultraviolet Photoelectron Spectroscopic-Molecular Orbital Study of Some Cyclopolyphosphines,
A. H. Cowley, Michael J. S. Dewar, M. Lattman, M. McKee, and J. L. Mills. 17 Jun 77, 8p AFOSR-TR-79-1102
Grants AFOSR-79-0008, NSF-CHE76-10331
Pub. in Jnl. of the American Chemical Society, v100 n11 p3349-3354, 24 May 78.

No abstract available.

AD-A078 449/6 PC **A02/MF A01**
Texas Univ At Austin Dept of Chemistry
Thermal and Electrical Properties of Transition Metal Complexes and Coordination Polymers of Pyrazine-2,5-dicarboxylic Acid,
Michael J. S. Dewar, and S. B. Brown. 18 Oct 78, 5p AFOSR-TR-79-1067
Grant AFOSR-79-0008
Pub. in Inorganica Chimica Acta, v34 p221-224 1979.

No abstract available.

AD-A078 450/4 PC **A02/MF A01**
Texas Univ At Austin Dept of Chemistry
MNDO Parameters for Third Period Elements,
Michael L. McKee, Michael J. S. Dewar, and Henry S. Rzepa. 27 Feb 78, 2p AFOSR-TR-79-1055
Grant AFOSR-79-0008
Pub. in the Jnl. of the American Chemical Society, v100 p3607 1978.

No abstract available.

AD-A078 453/8 PC **A02/MF A01**
Texas Univ At Austin Dept of Chemistry
Ground States of Molecules. 52. A MNDO SCF-MO Study of the Coordination of Beryllium-Indenyl and -Fluorenyl Complexes,
Michael J. S. Dewar, and Henry S. Rzepa. 13 Jul 78, 7p AFOSR-TR-79-1060
Grant AFOSR-75-2749
Pub. in Inorganic Chemistry, v18 n3 p602-605 1979. See also AD-A069 263.

No abstract available.

AD-A078 455/3 PC **A03/MF A01**
Maryland Univ College Park Inst for Fluid Dynamics and Applied Mathematics
Interactions of Ions and Electrons with Molecules.
Semi-annual progress rept. 1 Jul-31 Dec 73,
M. A. Coplan, and B. Siskind. Mar 74, 26p
Contract N00014-67-A-0239-0023

This report is an account of the progress made in the investigations of rotational and vibrational excitations which occur in collisions of li(6)+ with H2O molecules in the incident ion energy range from 10 to 40 eV (CM energies of 7.5 to 30 eV for the Li+ - H2O system). The large observed inelastic cross sections for the Li(6)+ - H2O system contrast sharply with observations of the scattering of Li(6)+ from N2 in this energy regime where no detectable excitations are found. (Author)

AD-A078 512/1 PC **A02/MF A01**
Rensselaer Polytechnic Inst Troy NY Dept of Materials Engineering
The Oxidation of Graphitic Monolayers on Ni(110).
Technical rept.,
Radhesyam Sau, and John B. Hudson. 1 Dec 79, 21p Rept no. TR-7
Contract N00014-75-C-0730

The reaction between oxygen gas and a graphitic carbon monolayer formed on an initially clean Ni(110) surface has been studied by a combination of Auger electron spectrometric and molecular beam relaxation spectrometric techniques. The only gaseous reaction product observed is CO. the kinetics of the reaction at 873K are well described by a model involving oxygen adsorption at defects in the graphitic monolayer followed by reaction to produce CO at these points and the subsequent growth of holes in the carbon layer as reaction proceeds. (Author)

AD-A078 513/9 PC **A03/MF A01**
Vermont Univ Burlington Dept of Chemistry
Synthetic Approaches to Mixed-Valence Chemistry,
Technical rept.,
David B. Brown, and James T. Wrobleski. 26 Nov 79, 28p Rept no. TR-18
Contract N00014-75-C-0756

Several preparative routes to mixed-valence materials have been examined and the effect of the synthetic variables discussed. It has been shown that solubility is a dominant factor in the successful isolation of many such materials. Soluble metal cluster complexes are susceptible to sequential oxidation/reduction reactions which lead to mixed-valence clusters, and the importance and utility of electrochemical measurements in the preparation and understanding of these clusters is discussed. The preparation of mixed-valence polymers by solid-state reactions and by polymer growth techniques has been examined, and the types of behavior exhibited are shown to be explicable using arguments derived from the thermodynamics of solutions. (Author)

AD-A078 524/6 PC **A02/MF A01**
Texas Univ At Austin Dept of Chemistry
Auger Spectra of Ammonia on Aluminum and Oxidized Aluminum.
Technical rept. 1 Jan-31 Dec 79,
Charles T. Campbell, J. W. Rogers, Jr., R. L. Hance, and J. M. White. 15 Nov 79, 10p Rept no. TR-10
Contract N00014-75-C-0922

X-ray excited N(KVV) Auger spectra are reported for submonolayer amounts of ammonia adsorbed at 126K on clean and oxidized polycrystalline aluminum. The spectra were deconvoluted using an instrument function derived from the measured losses associated with the N(1s) photoionization region. The resulting spectra are compared with gas phase and condensed NH3 spectra. (Author)

AD-A078 537/8 PC **A02/MF A01**
Oklahoma Univ Norman Dept of Chemistry
Oxy- and Thio- Phosphorus Acid Derivatives of Tin. III. The X-ray Crystal and Molecular Structure of Bis-(O-O' – Diphenyldithiophosphato) tin (II), Sn(s2P(OC6H5)2)2, a Bicyclic Dimer Held Together by h6-C6H5 to Tin (II) Interactions.
Technical rept.,
M. B. Hossain, J. L. Lefferts, K. C. Molloy, D. van der Helm, and J. J. Zuckerman. 12 Nov 79, 11p Rept no. TR-14
Contract N00014-77-C-0432
See also AD-A078 679.

The structure was studied by Monochromated Mo-K sub alpha radiation and refined to a final R value of 2.9% for 5517 reflections. The centrosymmetric, dimer contains one ligand bridging two tin atoms intermolecularly while simultaneously chelating one tin atom in an extremely anisobidentate manner. A planar Sn2S2four-membered ring is circumscribed by an (SnSPS)2 eight-membered ring. The dimer is in addition held together by a long pi-interaction of 3.46A along and S-Sn vector to be the center of one of the aromatic rings of an ester group of the bridging ligand of the second monomeric unit. This ring is oriented in a spacially significant position perpendicular to the assumed vector of the tin lone pair producing a distorted octahedral (4-6) geometry at the metal center.

AD-A078 589/9 PC **A02/MF A01**
Columbia Radiation Lab New York
The Physics of Spin-Polarized Atomic Vapors.
Final rept. 1 Mar 74-28 Feb 79,
W. Happer. Aug 79, 15p AFOSR-TR-79-1308
Grant AFOSR-74-2685

The overall objective of the work supported by the Air Force Office of Scientific Research grant has been to explore the basic physical properties of spin polarized atomic vapors. These systems are of considerable interest to the civilian and military sectors of our society because they can be used to make very precise measurements of time, absolute rotation rates, and electromagnetic fields. For example, the U.S. time standard is the atomic cesium hyperfine frequency; very precise atomic frequency standards are used in satellites and on earth for a wide variety of uses. Optically pumped magnetometers are used by the oil and mining industry for prospecting, by archaeologists for locating lost cities and sunken treasure ships, and by the navy for location of submarines. Optically pumped systems are currently being developed for use as gyroscopes which may have real advantages in terms of ruggedness and economy. In spite of the widespread practical utility of these systems, there is only limited research going on the related areas. There are no more than a dozen active research groups world wide and most are in foreign countries, including several excellent laboratories in the Soviet bloc. The goal of this work has been to maintain a center of excellence for the study of spin polarized atomic vapors, to ensure that outstanding students are introduced to the field from time to time and to coordinate our research activities with the needs of industrial and government laboratories for critical information and the needs of the university for high-quality basic research.

AD-A078 630/1 PC **A03**/MF **A01**
IBM Thomas J Watson Research Center Yorktown Heights NY
The Reaction of Acetylene with Ni(100) and Ni(110) Surfaces at Room Temperature.
Technical rept.,
J. E. Demuth. 1 Oct 79, 32p Rept no. TR-9
Contract N00014-77-C-0366

Ultraviolet photoemission spectroscopy using Hv=21.2eV and filtered 40.8eV radiation as well as temperature programmed thermal desorption spectroscopy are used to investigate the chemical reaction of acetylene with Ni(100) and Ni(110) surfaces at room temperature. Striking crystallographic effects and several coexisting phases are observed and found to be coverage and temperature dependent. A methodology is described to predict the relative energy levels for a variety of adsorbed hydrocarbon fragments on Ni surfaces. Such levels together with the thermal desorption spectra are used to identify the observed species. In particular, CH and CCH species are isolated on Ni(100) and Ni(110) surfaces, respectively via low temperature adsorption and subsequent pulsed sample warming experiments. The room temperature adsorption phases are deduced using these ionization levels together with those of chemisorbed acetylene, atomic hydrogen and carbon. At room temperature on Ni(100) H, C, CH and C2H2 species form together below 2 Langmuirs exposure while CH species form thereafter, up to saturation exposure of 10 Langmuirs. On Ni(110), H and CCH species form below 1.5 Langmuirs exposure followed by the formation of CH2 and likely CH species. The relative stabilities of these species at elevated temperatures is: C2H2<C2H<CH<CH2. A model for the bonding of acetylene and its reaction to form CCH species on Ni(110) is proposed. (Author)

AD-A078 679/8 PC **A02**/MF **A01**
Oklahoma Univ Norman Dept of Chemistry
Oxy- and Thio- Phosphorus Acid Derivatives of Tin. V. The X-ray Crystal and Molecular Structure of Bis-(O,O'-Diisopropyldithiophosphate)diphenyltin(IV), a Monomeric, Molecular, Virtual Polymer.
Technical rept.,
K. C. Molloy, M. B. Hossain, D. van der Helm, J. J. Zuckerman, and I. Haiduc. 19 Nov 79, 23p Rept no. TR-15
Contract N00014-77-C-0432
See also AD-A078 537.

The position of the tin atom was obtained from a Patterson map, and found to lie on the special position 0,0,0 (the crystallographic center of symmetry). The positions of the non-hydrogen light atoms were located by a succession of block-diagonal least squares refinements followed by a difference Fourier synthesis. Subsequent cycles of least-squares refinement allowed the thermal parameters to vary isotropically, initially, and anisotropically in later stages, to yield an R-factor of 0.054 for all data. At this point, correction was made for the anomalous dispersion of tin, and the structure further refined before all non-methyl hydrogen atoms were located from a final difference Fourier synthesis. Refinement was concluded when shifts in all parameters were less than one-third of their corresponding standard deviation. The final R factor was 0.033 for the 2599 reflections included in the least-squares calculations and 0.0522 over all data.

AD-A078 721/8 PC **A02**/MF **A01**
Columbia Univ New York
Picosecond Laser Studies of Aromatic Radical Ions.
Final rept. 1 Aug 76-31 Jul 79,
K. B. Eisenthal. Nov 79, 8p ARO-14086.4-C
Grant DAAG29-76-G-0310

A sophisticated picosecond laser and detection system has been constructed and used to obtain new information on key energy relaxing phenomena in molecular systems. (Author)

AD-A078 754/9 PC **A02**/MF **A01**
Illinois Univ At Urbana-Champaign Electro-Physics Lab
Hyper-Raman Scattering and Related Phenomena.
Paul D. Coleman. Dec 78, 8p AFOSR-TR-79-1292
Grants AFOSR-76-2988, EY-76-S-94-3573
Pub. in Proceedings of the International Conference on Lasers '78, 11-15 Dec 78, Orlando, FL, p93-98.

No abstract available.

AD-A078 755/6 PC **A02**/MF **A01**
Case Western Reserve Univ Cleveland OH Dept of Macromolecular Science
Conduction in Polydiacetylene Bilayers.
Technical rept.,
David R. Day, and Jerome B. Lando. 4 Dec 79, 16p Rept no. TR-2
Contract N00014-77-C-0213

Diacetylene monolayers polymerized at the gas water interface have a very poor conductivity. They do however exhibit a photoconductive and doping effect which can raise the conductivity over three orders of magnitude. Because of the initially low conductivity, the polydiacetylene monolayers could at best only be considered a poor semiconductor after doping. The possibility still remains that more exotic dopants such as AsF5 that are successfully applied to other conjugated polymers may result in higher conductivities in polydiacetylene monolayers. (Author)

AD-A078 800/0 PC **A02**/MF **A01**
Washington Univ Seattle Dept of Chemistry
A Crucial Demonstration of Strong Collision Behavior of Vibrational Energy for Gas-Surface Collisions.
Technical rept.,
M. C. Flowers, F. C. Wolters, D. F. Kelley, and B. S. Rabinovitch. 1 Dec 79, 9p Rept no. TR-14
Contract N00014-75-C-0690

The Variable Encounter Method was applied to the study of the transient region in vibrational accommodation of reacting cyclobutene at surfaces. Collision efficiency declines with rise of temperature. Surface collisions are more efficient than binary gas phase encounters and, at temperatures below 450K, the wall behaves like a theoretical strong collider. (Author)

AD-A078 806/7 PC **A02**/MF **A01**
Northwestern Univ Evanston IL Dept of Materials Science
Local Defect Arrays in Oxides.
Final rept.,
J. B. Cohen, and Frank C. Engelhart. 20 Nov 79, 7p ARO-13175.11-MS
Grants DAAG29-78-G-0156, DAAG29-76-G-0308

The goals of this grant were three-fold: (1) To develop quantitative techniques for the analysis of the diffuse x-ray scattering from oxides. The diffuse scattering is a function of many (often overlapping) interionic pair probabilities. (2) The monoxides of the first transition series of elements have a unique variation in properties. They are metallic conductors for the low atomic number end of the series, but semiconductors for the high atomic numbers. Is there a link between the defect arrangement and this behavior. (3) To clarify the defect arrays in stabilized zirconia. The studies have concentrated on VO2, VOx, TiOx, Zr(Ca)O2-x and Zr(Y)O(2-x).

AD-A078 819/0 PC **A03**/MF **A01**
Air Force Armament Lab Eglin AFB FL
Residual Levels of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) Near Herbicide Storage and Loading Areas at Eglin AFB, Florida.
Final rept. Jan 76-Dec 78,
Don D. Harrison, Charles I. Miller, and Richard C. Crews. Feb 79, 34p Rept no. AFATL-TR-79-20

A study was made of the residual levels of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in the areas surrounding three hardstands on Eglin AFB, Florida, that had been previously used for storing and loading military herbicides. The study deals only with areas in the immediate vicinity of these hardstands and their associated drainage systems. Massive quantities of herbicides, including Herbicide Orange, were loaded at these hardstands between 1962 and 1970. Only one of the three storage and loading areas was found to be contaminated with TCDD. Hardstand 8 and the East End of Taxiway 9 were relatively free of TCDD residues in the soil. Soil from around Hardstand 7, the most intensively used hardstand, still has concentrations of TCDD as high as 275 parts per billion (ppb), however. Concentrations of one-third that amount were present to a depth of one meter at two sampling sites. Soil contamination around Hardstand 7 is confined to a small area immediately surrounding the concrete pad. A map of TCDD soil concentrations is presented.

AD-A078 908/1 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst Troy NY Dept of Chemistry
Photochemical Transients of Electrode Bound Methylene Blue.
Technical rept. no. 2, 15 Jun 78-1 Oct 79,
Charles E. Baumgartner, Gary T. Marks, Herbert H. Richtol, and David A. Aikens. 17 Dec 79, 14p
Contract N00014-78-C-0494

A 520 nm transient was observed as the result of the interaction of methylene blue triplet with methylene blue bound to an electrode surface. The transient was observed by laser flash photolysis in an outgassed thin layer transparent electrochemical cell filled with a solution of .001 M methylene blue and 0.1M KCl in 50% aqueous methanol or 50% aqueous acetonitrile. The 520 nm transient is observed after application of an anodic potential of 0.1V to 0.7V vs Ag/AgCl for a few seconds on a Pt, Au or SnO2 electrode. The results indicate that methylene blue triplet is the precursor of the species associated with the 520 nm transient and this transient involves interaction of the triplet with electrodeposited dye. (Author)

AD-A078 942/0 PC **A03**/MF **A01**
Cincinnati Univ OH Dept of Materials Science and Metallurgical Engineering
Determination of the Polymer-Polymer Interaction Parameter for the Polystyrene-Polyisobutylene Pair.
Technical rept. no. 3, Dec 78-Nov 79,
Ryong-Joon Roe, and Wang-Cheol Zin. Dec 79, 43p
Contract N00014-77-C-0376

The light scattering technique was utilized to measure the phase separation temperatures (cloud points) of mixtures containing a polystyrene and a polybutadiene of various molecular weights and also of mixtures containing a polystyrene and a random or block copolymer of styrene and butadiene. The data was analyzed to obtain the polymer-polymer interaction parameter for the styrene-butadiene pair as a function of temperature and concentration. The value of the parameter deduced from the homopolymer mixtures agrees well with that obtained from the mixtures containing a copolymer. The polymer-polymer interaction pa-

rameter thus evaluated was compared with a theoretical expression derived on the basis of the Flory equation-of-state theory. The effect of the free volume disparity between the two components was found to play a relatively minor role in determining the interaction parameter when the two polymers lack any specific interactions which would make them mutually miscible. (Author)

N80-14201/1 PC **A03/MF A01**
Toulouse Univ. (France). Lab. de Genie Electrique.
Study of the Transformation of Synthetic and Polypropylene Fibers Undergoing Electrical Discharges at High Pressure Etude la Transformation de Fibres Synthetiques, du Polypropylene Par l'Action de Decharges Electriques a Haute Pression.
C. Antonio, and J. Sarlaboux. Sep 78, 27p PUBL-369
Conf-Presnted at Conv. De Rech. Action de l'Effluve sur les Surfaces, 1979. Language in French.

The physical and chemical transformation of polyester fibers and polypropylene films subjected to a corona type discharge treatment was studied. The adsorption isotherms were obtained by inverse chromatography, and the specific surfaces were determined by the gas adsorption technique. The polyester (polyethylene terephtalate) initially shows a decrease in the adsorption capacity, and for longer treatments a progressive increase. The initial decrease appears to be associated with the hydrogen bonds. The polypropylene film shows a consistent reduction in electric ridigity with treatment time and large degradation effects at the electron microscope when treated in an oxydizing atmosphere.

N80-14211/0 PC **A02/MF A01**
Jet Propulsion Lab., Pasadena, CA.
Methods for Calculation of Engineering Parameters for Gas Separation.
D. D. Lawson. 1 Oct 79, 25p NASA-CR-162532, JPL-PUB-79-46
Contract NAS7-100
Subm-Sponsored in Part by DOE.

A group additivity method is generated which allows estimation, from the structural formulas alone, of the energy of vaporization and the molar volume at 25 C of many nonpolar organic liquids. Using these two parameters and appropriate thermodynamic relations, the vapor pressure of the liquid phase and the solubility of various gases in nonpolar organic liquids are predicted. It is also possible to use the data to evaluate organic and some inorganic liquids for use in gas separation stages or liquids as heat exchange fluids in prospective thermochemical cycles for hydrogen production.

N80-14257/3 PC **A04/MF A01**
National Bureau of Standards, Washington, DC. Thermophysical Properties Div.
Thermodynamic Properties of Nitrogen Gas Derived from Measurements of Sound Speed.
B. Younglove, and R. D. Mccarty. Dec 79, 56p NASA-RP-1051, NBSIR-79-1611
NASA ORDER L-55450-A, NASA ORDER L-69159-A

A virial equation of state for nitrogen was determined by use of newly measured speed-of-sound data and existing pressure-density-temperature data in a multiproperty-fitting technique. The experimental data taken were chosen to optimize the equation of state for a pressure range of 0 to 10 atm and for a temperature range of 60 to 350 K. Comparisons are made for thermodynamic properties calculated both from the new equation and from existing equations of state.

N80-14358/9 PC **A02/MF A01**
Jet Propulsion Lab., Pasadena, CA.
Potential Heat Exchange Fluids for Use in Sulfuric Acid Vaporizers.
D. D. Lawson, and G. R. Petersen. 1 Oct 79, 16p NASA-CR-162548, JPL-PUB-79-81
Contracts NAS7-100, ET-78-I-01-3112

A series of perhalocarbons are proposed as candidate heat exchange fluids for service in thermochemical cycles for hydrogen production that involve direct contact of the fluid with sulfuric acid and vaporization of the acid. The required chemical and physical criteria of the liquids are described and the results of some preliminary high temperature test data are presented.

N80-14581/6 PC **A03/MF A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Sulfate and Nitrate Collected by Filter Sampling Near the Tropopause.
F. M. Humenik, E. A. Lezberg, and D. A. Otterson. Jan 80, 30p NASA-TP-1567, E-073

Filter samples collected near the tropopause with an F-106 aircraft and two Boeing 747 aircraft were analyzed for sulfate and nitrate ion content. Within the range of routine commercial flight altitudes (at or below 12.5 km), stratospheric mass mixing ratios for the winter-spring group averaged 0.26 ppbm for sulfate and 0.35 ppbm for nitrate. For the summer-fall group, stratosphere mixing ratios averaged 0.13 ppbm and 0.25 ppbm for sulfate and nitrate, respectively. Winter-spring group tropospheric mass mixing ratios averaged 0.08 ppbm for sulfate and 0.10 ppbm for nitrate, while summer-fall group tropospheric mixing ratios averaged 0.05 ppbm for sulfate and 0.08 ppbm for nitrate. Correlations of the filter data with available ozone data suggest that the sulfate and nitrate are transported from the stratosphere to the troposphere.

N80-14878/6 PC **A02/MF A01**
Williams Coll., Williamstown, MA.
Effects of Hydrogen Atom Spin Exchange Collisions on Atomic Hydrogen Maser Oscillation Frequency.
Final Technical Report, 1 Dec. 1977 - 30 Nov. 1979.
S. B. Crampton. 1979, 15p NASA-CR-162525
Grant NSG-5218

Frequency shifts due to collisions between hydrogen atoms in an atomic hydrogen maser frequency standard are studied. Investigations of frequency shifts proportional to the spin exchange frequency shift cross section and those proportional to the duration of exchange collisions are discussed. The feasibility of operating a hydrogen frequency standard at liquid helium temperatures is examined.

N80-14879/4 PC **A03/MF A01**
Xavier Univ. of Louisiana, New Orleans. Dept. of Physics/Pre-Engineering.
Calculation of Total Cross Sections for Charge Exchange in Molecular Collisions.
Final Report.
J. Ioup. 31 Dec 79, 32p NASA-CR-162560
Grant NSG-1361

Areas of investigation summarized include nitrogen ion-nitrogen molecule collisions; molecular collisions with surfaces; molecular identification from analysis of cracking patterns of selected gases; computer modelling of a quadrupole mass spectrometer; study of space charge in a quadrupole; transmission of the 127 deg cylindrical electrostatic analyzer; and mass spectrometer data deconvolution.

N80-14920/6 PC **A04/MF A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Electron Spectra Resulting from Autoionization in Low-Energy Li(+) + He Collisions.
A. Yagishita, K. Wakiya, T. Takayanagi, H. Suzuki, and F. Koike. Sep 79, 55p IPPJ-420

Spectra of electrons ejected from doubly excited states of helium were extensively measured at several observation angles of impact with lithium ions at energies lower than 5 keV. 'Molecular-autoionization' spectra were found at forward observation angles, and analyzed in terms of the Gerber-Niehaus theory with modification. The spectral shapes of atomic-autoioniztion peaks are discussed in relation to both the Barker-Berry effect and the Doppler effect. Excitation cross sections of autoionizing states are determined by a method that uses simultaneous impact of ions and electrons.

N80-14941/2 PC **A04/MF A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
An Extended Soft-Cube Model for the Thermal Accommodation of Gas Atoms on Solid Surfaces.
J. R. Burke, and D. J. Hollenbach. Jan 80, 61p NASA-TM-81163, A-8047
Subm-Prepared in Cooperation with San Francisco State Univ.

A numerical soft cube model was developed for calculating thermal accommodation coefficients alpha and trapping fractions f sub t for the interaction of gases incident upon solid surfaces. A semiempirical correction factor c which allows the calculation of alpha and f sub t when the collision times are long compared to the surface oscillator period were introduced. The processes of trapping, evaporation, and detailed balancing were discussed. The numerical method was designed to treat economically and with moderate (+ or - 20 percent) accuracy the dependence of alpha and f sub t on finite and different surface and gas temperatures for a large number of gas/surface combinations. Comparison was made with experiments of rare gases on tungsten and on alkalis, as well as one astrophysical case of H2 on graphite. The dependence of alpha on the soft cube dimensionless parameters is presented graphically.

PB80-112212 PC **A03/MF A01**
Bureau of Mines, Albany, OR. Albany Metallurgy Research Center.
Determination and Estimation of Ionic Activities of Metal Salts in Water.
Rept. of investigations,
N. A. Gokcen. 1979, 29p BUMINES/RI-8372

In this report, appropriate equations correlating the activity of water with the activities of electrolytes in binary and multicomponent solutions have been derived for computer calculation. It was found that the half-integer power series are far superior to the integer power series, for both types of series having the same number of terms. The proposed method of calculation is capable of accurately yielding the activities of all components from the measurements of the activity of a single component at various concentrations. This method replaces the cumbersome and objectionable method of graphical integration of the Gibbs-Duhem equation. Two novel methods are proposed for determination of activities of electrolyte solutions important in hydrometallurgy: (1) Water vapor pressure measurement by differential pressure transducers having an accuracy of 0.001 pct, and (2) transpiration method with an inert gas bubbled through concentrated solutions followed by the analysis of the evaporated and redissolved electrolytes with specific ion electrodes having a sensitivity of + or - 10 to the -10th power molal. The first method is suitable for nonvolatile electrolytes, and the second, for volatile electrolytes such as hydrogen halides, HNO3, N2SO3, etc. The existing methods of estimation of ionic activities have been surveyed, and the best method has been selected, discussed, and summarized.

PB80-122278 PC **A04/MF A01**
California Univ., Riverside. Statewide Air Pollution Research Center.
Oxidant-Precursor Relationships.
Final rept.,
Edgar R. Stephens, and Oscar P. Hellrich. Aug 79, 74p EPA/600/3-79-076
Grant EPA-R-803799

New methods of ambient air analysis were used to define more clearly the relationships between oxidants and their precursors. Non-methane hydrocarbons, NOx, O2, and oxidants were measured at the same time and location (Riverside, California). The ambient air data presented in this report are displayed as a series of conditional joint distributions. The correlations range from excellent--ozone vs oxidant--to poor or bimodal--ozone with nonmethane-ethane organics (NMEO) or with NOx. The ratio of NMEO to NOx was always higher than indicated by inventories and showed a large scatter. No depletion of NMEO with respect to acetylene could be detected.

PB80-122856 Not available NTIS
National Bureau of Standards, Washington, DC.
Laser Bandwidth and Intensity Effects in Multiphoton Ionization of Sodium.
Final rept.,

S. J. Smith, and P. B. Hogan. Oct 79, 8p
Pub. in Proc. Int. Conf. on Laser Spectroscopy (4th), Rottech-Egern, Germany, June 11-15, 1979 p360-367 Oct 79.

Recently there has been interest in the development of theoretical methods for incorporating the effects of finite laser bandwidth in the treatment of the ac Stark effect in the two-level atom approximation, and in the extension of this model to approximate descriptions of 'weak probe' double resonance experiments. In this paper, the authors briefly describe some experimental observations which have played a role in motivating recent developments in the mathematical framework for treating finite laser bandwidth effects in phase diffusion models and, more recently, in chaotic field models which include the effects of amplitude fluctuations.

PB80-122896 Not available NTIS
National Bureau of Standards, Washington, DC.
Test for Ion Dynamic Dependence of Plasma Red Shifts in Neutral Hydrogen.
Final rept.,
D. E. Kelleher, N. Konjevic, and W. L. Wiese.
Sep 79, 2p
Pub. in Phys. Rev. A 20, n3 p1195-1196 Sep 79.

The plasma red shifts of H(alpha) and D(alpha) were measured in an atmospheric-pressure wall-stabilized arc, which was operated in argon with a small admixture of either hydrogen or deuterium. The measurements have yielded, within the experimental uncertainties, the same red shifts for H(alpha) and D(alpha), i.e., zero mass dependence.

PB80-123334 Not available NTIS
National Bureau of Standards, Washington, DC.
Monte Carlo Calculations of Absolute X-Ray Generation from Solid Targets,
Dale E. Newbury, and Robert L. Myklebust. 1979, 3p
Pub. in Proceedings of the Annual Microbeam Analysis Society/1979 Conference (14th) Held at San Antonio, TX. on August 13-17, 1979, p51-53 1979.

Monte Carlo electron trajectory calculations of the absolute characteristic yield x-ray generated in solid targets bombarded by electrons with energies in the range 5 - 25 keV are reported. Four different cross sections for inner shell ionization have been tested: Bethe (Mott-Massey), Green-Cosslett, Fabre, and Worthington-Tomlin. Comparison of the calculated absolute x-ray yield with recent experimentally determined values reveals differences of a factor of two or more for some of the cross sections. In general, the Bethe (Mott-Massey) gives the closest correspondence to the experiment.

PB80-123342 Not available NTIS
National Bureau of Standards, Washington, DC.
Analysis of Particles and Rough Samples by FRAME P, a ZAF Method Incorporating Peak-to-Background Measurements,
J. A. Small, D. E. Newbury, and R. L. Myklebust. 1979, 4p
Pub. in Proceedings of the Annual Microbeam Analysis Society/1979 Conference (14th) Held at San Antonio, TX. on August 13-17, 1979, p243-246 1979.

The ideal specimen for electron probe microanalysis has the form of a bulk solid with a flat, polished surface. When samples are analyzed which deviate from this condition, such as small particles or specimens with rough surface topography, large errors in the composition calculated from a ZAF method can arise, frequently exceeding 50% relative. Moreover, normalization of the results by forcing the sum of the elements to 100% can sometimes actually increase the relative errors. Providing instrumental conditions are kept constant, the x-ray intensities measured on a flat, bulk sample vary for compositional reasons only. In the case of a particle or rough surface, however, geometrical factors including size and shape of the sample relative to the electron interaction volume and x-ray emergence angle can also strongly affect the measured signals. Recently, a new method for compensation of the geometrical effects has been independently suggested by Small et al and Statham and Pawley. This method is based on the observation that to a first approximation the ratio of a characteristic x-ray peak to the continuum intensity of the same energy for a flat, bulk target is equivalent to the ratio from a particle or rough surface of the same composition.

PB80-123367 Not available NTIS
National Bureau of Standards, Washington, DC.
Microhomogeneity Studies for NBS Standards,
R. B. Marinenko, K. F. J. Heinrich, and F. C. Ruegg. 1979, 6p
Pub. in Proceedings of the Annual Microbeam Analysis Society/1979 Conference (14th) Held at San Antonio, TX. on August 13-17, 1979, p221-226 1979.

A simple routine technique for studying homogeneity in the micrometer range with the electron microprobe has been developed. For graphic display, a digital periodic integrator is being used. In conjunction with scalers and a stepping motor on the sample stage, traces similar to industrial control charts based on a comparison of the experiment with the expected (Poisson) counting statistics are quickly obtained. A computer program has been developed to numerically evaluate sample homogeneity. Several Standard Reference Materials (SRM's) have been tested. These include the iron and steels (SRM's 661-664, 461, and 463), the gold-copper and gold-silver alloys (SRM's 481 and 482), the tungsten-molybdenum alloys (SRM 480), cartridge brass (SRM 478), the iron 3-percent silicon alloy (SRM 483), and the iron-chromium-nickel alloy (SRM 479a). The Research Material, Glasses for Microanalysis (RM-30), has also been tested.

PB80-123375 Not available NTIS
National Bureau of Standards, Washington, DC.
Reaction of Anthranilic Acid with Cupric Ion-Containing Hydroxyapatite Surface,
Dwarika N. Misra, and Rafael L. Bowen. 1979, 9p
Grant PHS-DE-05129
Pub. in Paper in Surface Contamination, n2, p983-991 1979.

Equal amounts of anthranilic acid (o - aminobenzoic acid) are irreversibly adsorbed on hydroxyapatite surface with or without pretreatment of the surface with cupric ions. Cupric ions enhance the strength of the bonding between anthranilic acid and the hydroxyapatite surface by effecting chemisorption of the acid molecules at their sites. This result, in itself, is of considerable interest to the chemistry of adhesion; but it is also shown that the chemisorption process is followed by a desorption of cupric anthranilate molecules and the formation of its crystals as a separate phase. A kinetic analysis of the latter process is of interest, because it is consistent with a model in which the rate is controlled by the concentration of the unreacted cupric ions remaining on the surface of the hydroxyapatite.

PB80-123383 Not available NTIS
National Bureau of Standards, Washington, DC.
Investigations into the Critical Measurement Aspects of Raman Microprobe Analysis.
Final rept.,
Edgar S. Etz, and John J. Blaha. 1979, 12p
Pub. in Proceedings of the Annual Microbeam Analysis Society/1979 Conference (14th) Held at San Antonio, TX. on August 13-17, 1979, p173-184 1979.

In the course of NBS research in Raman microprobe analysis experiments have been performed to better define the critical measurement aspects of micro-Raman spectroscopy. Discussed are several experimental criteria and their relationship to successful molecular microanalysis. Spatial resolution of the probe measurement is discussed in terms of effective sampling volume determined by the design of the NBS microprobe. Effects of laser-induced sample heating and optical breakdown of microsamples are illustrated by examples from the analysis of environmental particles. Spectral interference from sample fluorescence are illustrated for microparticulate polynuclear aromatic hydrocarbons. Measurement problems arising from the chemical reactivity of microparticles are discussed with reference to sample modifications observed for hygroscopic particles. The question of weak signal measurements is examined from the point of view of the potential benefits to be derived from the application of optical multichannel analyzers as detection devices. Several areas requiring further experimental investigations are identified for the further enhancement of the field.

PB80-123391 Not available NTIS
National Bureau of Standards, Washington, DC.
The Use and Abuse of a Quantitative Analysis Procedure for Energy Dispersive X-Ray Microanalysis,
Robert L. Myklebust, and Dale E. Newbury. 1979, 7p
Pub. in Proceedings of the Annual Microbeam Analysis Society/1979 Conference (14th) Held at San Antonio, TX. on August 13-17, 1979, p231-237 1979.

FRAME C, a procedure for quantitative energy dispersive x-ray microanalysis, is capable of high relative accuracies when the proper required analytical conditions are observed. Evaluation of the errors introduced by poor spectral quality (poor statistics, high deadtime counting, and errors in the energy calibration), uncertainty in user-supplied parameters (beam energy, x-ray emergence angle, and background selection), and specimen roughness reveals that average relative errors increase by factors of 2 to 20. The most significant errors are introduced by surface roughness.

PB80-124274 PC A03/MF A01
Massachusetts Univ., Amherst. Dept. of Chemical Engineering.
Catalytic Decomposition of Hydrogen Peroxide by Manganese-Alumina,
Joseph T. Kohler, Robert E. Altomare, and James R. Kittrell. Jan 74, 30p NSF/RA/T-74-215

Kinetic and deactivation studies conducted in a tubular flow reactor for the decomposition of hydrogen peroxide over manganese dioxide supported on alumina are reported. Catalytic decomposition of hydrogen peroxide is applicable to many areas of food processing involving sterilization of food products. Of special interest, is the potential use of stable inorganic catalysts in conjunction with immobilized catalase in the economical conversion of hydrogen peroxide into water and oxygen. In such an operation the inorganic catalyst could be used at the top of a tubular flow reactor in the presence of high peroxide levels of an incoming food product stream; the highly active immobilized catalase then could be used as the bottom portion of the catalyst bed in the same reactor to remove all traces of hydrogen peroxide leaving the inorganic catalyst bed. Experimental methods for these studies are described. Results indicate that manganese-alumina is a satisfactory catalyst for hydrogen peroxide decomposition either alone or with immobilized catalase. Kinetics of the system appear to be first order over the range of variables studied, but corrections for the rate constants are required due to particle size of feed buffer ions. Ions such as citrate and phosphate severely inhibit catalytic activity.

PB80-124316 PC A04/MF A01
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemical Engineering.
Fundamental Studies of Desalination by Freezing.
Final rept.,
Kenneth A. Smith, and Adel F. Sarofim. Jan 79, 75p W80-02155, OWRT-3268(1)
Contract DI-14-20-3268

Studies on a pilot-scale crystallizer were used to determine the subcooling of the brine solution, the particle size distribution and the permeability of the ice product in a 6% by weight brine solution for various ice production rates, agitation powers, and ice concentration. These data were used to generate ice crystal growth rates and nucleation rates to compare with generalized correlations developed for ice growth and nucleation. By application of population balance mathematics to a well-stirred continuous crystallizer, a quantitative relationship between ice particle size and ice production rate was developed. The growth kinetic parameters needed for application of the resulting relations were determined from a systematic study of the mass transfer to discs, spheres, and cylinders suspended in a turbulent agitated fluid. The results could be represented by a single correlation between the Sherwood number, the Schmidt

number, and the Kolmogoroff power number, for a range of impeller designs and types, vessel aspect ratios, and impeller-to-vessel dimensions. Correlations for ice nucleation kinetics were determined from batch crystallizer studies for a wide range of salt concentration, solution subcooling, and agitation power.

PB80-124332 PC **A04/MF A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
Chemical Analysis of Wet Scrubbers Utilizing Ion Chromatography.
Final rept. Sep 77-Sep 78,
Tobias R. Acciani, and Ray F. Maddalone. Jul 79, 63p EPA/600/7-79/151
Contract EPA-68-02-2165

The report describes the key elements required to develop a sampling and analysis program for a wet scrubber using ion chromatography as the main analytical technique. The first part of the report describes a sampling program for two different types of wet scrubbers: the venturi/spray-tower (limestone) scrubber which is part of the EPA/TVA Shawnee Test Facility, Paducah, Kentucky; and the Arthur D. Little dual alkali pilot scrubber. The sampling section of the report describes the scrubber type, sample collection, and sample preservation. The analysis section of the report, describing the theory and practice of ion chromatography as applied to wet scrubber samples, describes analytical procedures, qualitative analysis, and quantitative analysis. The analytical procedures portion covers the anion and cation analysis scheme for wet scrubber samples, the theory of ion chromatography, and current problems involving the use of ion chromatography for wet scrubber related samples.

PB80-124548 PC **A05/MF A01**
National Bureau of Standards, Washington, DC.
Journal of Research of the National Bureau of Standards. Volume 84, Number 4, July-August 1979.
Bi-monthly rept.
1979, 77p
See also Volume 84, Number 3, PB-300 272. Library of Congress catalog card no. 62-37059.

Contents:
- Enthalpies of solution of KBr, KI, KIO3, and KIO4 in H2O;
- A preliminary study of the fluid mechanics of liquid penetrant testing;
- Exact coefficients for the limit cycle in Van der Pol's equation;
- Tensile behavior of some mathematical models of paper networks;
- A class of double integrals involving Gaussian and trigonometric factors.

PB80-124555
(Order as PB80-124548, PC **A05/MF A01**)
National Bureau of Standards, Washington, DC. National Measurement Lab.
Enthalpies of Solution of KBr, KI, KIO3, and KIO4 in H2O,
M. E. Efimov, G. N. Klevalchuk, V. A. Medvedev, and Marthada V. Kilday. 7 Mar 79, 14p
Prepared in cooperation with Akademiya Nauk SSSR, Moscow.
Included in Jnl. of Research of the National Bureau of Standards, v84 n4 p273-286, Jul-Aug 79.

Enthalpy of solution measurements of four potassium salts in H2O were made in either an adiabatic or an esoperibol calorimeter or both. The measured and recommended values are given.

PB80-124670 PC **A04/MF A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Chemistry.
Investigation of Intermolecular Association in Concentrated Solutions of Cellulose Acetate.
Final rept.,
G. C. Berry, T. S. Sham, and M. A. Leech. 1979, 72p W80-02297, OWRT-S-0012(7528)(1)
Contract DI-14-34-0001-7528

The role of intermolecular association in concentrated solutions of cellulose triacetate (CTA) is investigated with respect to its importance in controlling the properties of CTA films formed from concentrated solutions for use, for example, as membranes in desalination by the reverse osmosis technique. The studies reveal the presence of extensive intermolecular association of CTA, even in very dilute solutions. The data also reveal that CTA has a larger unperturbed dimension than secondary cellulose diacetate. Rheological data obtained on some moderately concentrated solutions also exhibit the effects of interchain association. It appears that association leads to the formation of loci of imperfectly ordered domains that act as crosslinks, forming a type of randomly branched structure. This extent of this structure may control the properties of films formed from such solutions.

PB80-124852 PC **A03/MF A01**
Envirogenics Systems Co., El Monte, CA.
Development of a Composite Reverse Osmosis Membrane for Single Pass Seawater Desalination.
Final rept.,
A. F. Graefe. Feb 79, 41p 1223-15, W80-02295, OWRT-7541(1)
Contract DI-14-34-0001-7541

The objective was to develop an improved reverse-osmosis composite non-cellulosic membrane for the single pass desalination of seawater, and to demonstrate its performance in the form of four inch diameter spiral elements. Three membranes were investigated. One membrane consisted of an active barrier layer of polymerized and sulfonated furfuryl alcohol deposited on the surface of a cloth-backed polysulfone microporous support (SPFA membrane). This membrane exhibited outstanding initial reverse-osmosis properties (water fluxes up to 23 gfd at 99.6% salt rejection with simulated seawater at 800 psi), but was inherently unstable. The seat of the instability is believed to lie in the hydrolytic cleavage, with attendant depolymerization, of sulfate ester groups present in the barrier layer. Another membrane consisted of a sulfonated, phenol-aldehyde resin on the same polysulfone support (SPAR). This membrane was also inherently unstable for the reason noted above. The third membrane, which consisted of a sulfonated polyphenylene oxide on the same polysulfone support (SPPO), was found to be unsuitable for the single pass desalination of seawater. It was concluded from the overall experimental data that the fabrication of composite membranes at elevated temperatures in the presence of sulfuric acid is probably attended by complex side reactions, one or more of which could easily lead to membrane instability.

PB80-126204 PC **A03/MF A01**
Envirogenics Systems Co., El Monte, CA.
Development of Low Pressure Brackish Water Reverse Osmosis Membranes.
Final rept.,
A. F. Graefe, and W. J. Schell. May 79, 42p 1093-25, W80-02296, OWRT-7510(1)
Contract DI-14-34-0001-7510
See also PB-299 226.

The objective was to develop chemically stable non-cellulosic desalination membranes with reverse osmosis properties at pressures of 250 psi or less that are equivalent to those of currently available cellulosic membranes operating at 400 psi. It was also desired that the new membranes exhibit improved chemical stability over cellulosic membranes. Several membranes were investigated. One membrane consisted of a thin layer of sulfonated polyfurfuryl alcohol on a microporous polysulfone as a support (SPFA). This membrane exhibited water flux values up to 50 gfd at 98% salt rejection when tested at 250 psi with 0.5% sodium chloride. However, subsequent long term testing of the membrane in element form at 100 to 300 psi showed that it was unstable to simulated Yuma feedwater. Another membrane of interest was asymmetric, and was fabricated from a sulfonated polysulfone (SPS). It was resistant to biodegradation, to high and low pH levels, to elevated temperatures, and to at least 50 ppm of free chlorine. This membrane exhibited excellent stability after an initial deswelling period when tested with simulated Yuma feedwater at 100 to 300 psi, but its reverse osmosis properties were not superior to those of cellulose acetate. Other membranes investigated either exhibited low water flux values or low salt rejection values when tested under brackish water conditions.

PB80-127418 CP **T02**
Environmental Protection Agency, Washington, DC.
CICIS - Chemical Inventory Information Tape: Supplement 1.
Data file,
Robert April, and Chris Harvey. Nov 79, mag tape EPA/DF-80/001
Supplement to PB-295 108.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

This tape is a computer readable version of the Toxic Substances Control Act (TSCA) Chemical Substance Inventory: Supplement I. For a complete understanding of the data contained on this tape it is necessary to read the introductory material in the hardcopy version. This description will only touch on a few important points. This supplement lists approximately 2,900 additional chemical substances in commerce in the United States. It is not a list of toxic chemicals; toxicity was not a criterion used in compiling the list. The tape consists of two major sections. The first section is the inventory, and is a listing of each substance with its CAS Registry Number, preferred name, and molecular formula where appropriate. The second section is an index to the first by synonymous names. Because of possible ambiguities in synonyms, this section must not be confused with the inventory itself. The presence of a name for a substance on this second section is not a guarantee that this substance is on the inventory. Reference to the first section is always necessary.

PB80-132046 PC **A07/MF A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
A Fluorescence Standard Reference Material: Quinine Sulfate Dihydrate.
Final rept.,
R. A. Velapoldi, and K. D. Mielenz. Jan 80, 143p
NBS-SP-260-64
Library of Congress catalog card no. 79-600119.
See also PB-294 666.

The need, material selection, characterization, certification, and uses of the fluorescence Standard Reference Material, quinine sulfate dihydrate, have been discussed. The emission spectrum for quinine sulfate dihydrate in 0.1 mol/L HClO4 has been measured on the NBS reference spectroradiometer. The technical emission spectrum has been corrected for the instrumental parameters of the spectral responsitivity of the detection system, photomultiplier tube nonlinearity, bandpass, monochromator wavelength error, and further corrections for the sample parameters of solvent refractive index and cell window transmittance were applied to obtain the molecular emission spectra. The purity and the stability of the SRM quinine sulfate dihydrate and the effect of solute concentration, solvent acid, acid concentration, excitation wavelength, oxygen quenching, temperature and polarized exciting radiation on the emission spectrum, and in part, on the absorbance spectrum, photon yield, and fluorescence lifetime also have been discussed.

PB80-138712 Not available NTIS
National Bureau of Standards, Washington, DC.
Realization of Triple Point of Argon in a Transportable Sample Cell.
Final rept.,
G. T. Furukawa. 1979, 3p
Pub. in Proceedings of the Session Comite Consultatif De Thermometrie Meeting (12th), Sevres, France, May 9-10, 1978, Annexe T 13, p-T100-T102.

An argon sample of stated purity of 99.9999 percent was sealed in a miniature pressure cell and the triple point was investigated by melting-point measurements. The triple point of argon was found to be 83.8003(8) K. The results of the measurements show that the exchange of miniature pressure cells of argon should permit the definition of the argon triple-point temperature to within 0.1 mK or smaller.

PB80-804446 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.

Laser Raman Spectroscopy (Citations from the NTIS Data Base).
Rept. for 1970-Jan 80,
Diane M. Cavagnaro. Feb 80, 195p
Supersedes NTIS/PS-79/0056, NTIS/PS-78/0108 and NTIS/PS-77/0119.

The theory and applications of laser Raman spectroscopy are cited, including studies on crystal structure, laser excitations of the molecule into different energy levels, gas analysis, and theoretical interpretation of spectra. (This updated bibliography contains 188 abstracts, 16 of which are new entries to the previous edition.)

PB80-804669 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Laser Spectroscopy. Volume 3. 1977-January, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-Jan 80,
Diane M. Cavagnaro. Feb 80, 202p
Supersedes NTIS/PS-79/0100, NTIS/PS-78/0107, and NTIS/PS-77/0120. See also Volume 1, 1970-1974, NTIS/PS-76/0100 and Volume 2, 1975-1976, NTIS/PS-78/0107.

This bibliography contains citations on laser spectroscopy. The research includes infrared, visible, laser photofragment, and laser microwave spectroscopy. Topics include spectrometer design, chemical analytical techniques, and spectral analysis. Raman spectroscopy is excluded. (This updated bibliography contains 295 abstracts, 90 of which are new entries to the previous edition.)

7E. Radio and Radiation Chemistry

PATENT-4 172 775 Not available NTIS
Department of the Navy Washington DC
Photochemical Separation of Metals in Solution by Precipitation Following Reduction or Oxidation.
Patent,
Terence Donohue. Filed 9 Feb 78, patented 30 Oct 79, 6p AD-D006 779/3, PAT-APPL-876 297
Supersedes PAT-APPL-876 297-78, AD-D004 731.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Mixtures of metals are separated by forming salts of the metals which exhibit photoredox activity with an anion selected to provide insoluble salts at one oxidation state and soluble salts at another oxidation state, forming a solution of these slats with a solvent selected to permit a difference in solubility of salts dissolved at different oxidation salts and to be nonreactive with the nonsoluble salts, irradiating the solution with light at a wavelength which changes the oxidation state of the metal ion most susceptive to a chage in oxidation state, and separating the insoluble salt formed thereby from the solution. (Author)

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

N80-14667/3 PC **A08**/MF **A01**
Centre Oceanologique de Bretagne, Brest (France).
The Antiprod-1 Campaign on Board the Marion Dufresne, 1-28 March 1977. Campagne Antiprod 1. Marion Dufresne. 1-28 MARS 1977.
1978, 153p CNEXO-16-1978
Text in French; English Summary.

During the cruise Antiprod I of the supply ship, Marion-Dufresne, the characteristics of planktonic production and of the factors which condition it were studied in the Indian Ocean on the region of influence of the antarctic divergence at the end of the summer. The essential data of the work done in the scope of a descriptive study is presented; 29 stations, situated along a N-S line between 40 and 62 deg S, West of the Kerguelen islands, are mentioned. The most interesting results are the demonstration of an unusual structure in the Antarctic, with Antarctic and subtropical convergencies joining, the marked poverty of phytopiankton since the maximal biomass and the resulting transparency of the waters can be compared to the oligotroph seas, such as the Mediterranean, and the very particular behavior of the silicates which are used up (or are not renewed) much more quickly than the other nutrients when the waters of the divergency drift northwards.

PB80-131253
(Order as PB80-131238, PC **A10**/MF **A01**)
Lawler, Matusky and Skelly Engineers, Pearl River, NY.
Shallow Marsh Habitats as Primary Nurseries for Fishes and Shellfish, Cape Fear River, North Carolina,
Michael P. Weinstein. Apr 79, 20p NOAA-79102302-2
Prepared in cooperation with Carolina Power and Light Co., Raleigh, NC.
Included in Fishery Bulletin, v77 n2 p339-357 Apr 79.

Seine and rotenone collections taken during 1977 from the upper reaches of tidal creeks and along the marsh fringe in the vicinity of the Cape Fear River, NC. indicated that these areas serve as primary nursery habitats for postlarval and juvenile fishes and shellfish. Average densities for several ocean-spawned species at the peak of postlarval or early juvenile recruitment were high. Standing crops for the majority of species studied further indicated that lower productivity per unit area occurred in high salinity marshes closest to the ocean. In addition, distribution patterns for several species were significantly correlated with salinity and substrate characteristics or combinations of them. Similarly, freshwater fishes invaded brackish marshes during periods of high river flow.

PB80-131261
(Order as PB80-131238, PC **A10**/MF **A01**)
Smithsonian Institution, Fort Pierce, FL. Fort Pierce Bureau.
Larval Development of the Cuban Stone Crab, 'Menippe nodifrons' (Brachyura, Xanthidae), under Laboratory Conditions with Notes on the Status of the Family Menippidae,
Liberta E. Scotto. Apr 79, 30p NOAA-79102302-3
Also pub. as Smithsonian Institution-Harbor Branch Foundation, Inc., Scientific Consortium, Scientific Contribution No. 118.
Included in Fishery Bulletin, v77 n2 p359-386 Apr 79.

The complete larval development of the Cuban stone crab, Menippe nodifrons, is described and illustrated. Larvae reared in the laboratory passed through a prezoeal, five and uncommonly six zoeal, and one megalopal stage. The six zoeal stages of M. nodifrons are compared with those of its sympatric congener M. mercenaria and with the first zoeal stage of the Indo-Pacific species M. rumphii. The possible reestablishment of the family Menippidae is discussed in view of new larval evidence.

PB80-131279
(Order as PB80-131238, PC **A10**/MF **A01**)
National Marine Fisheries Service, Auke Bay, AK. Auke Bay Lab.
Assessment of Composition of Stock Mixtures,
Jerome J. Pella, and Timothy L. Robertson. Apr 79, 13p NOAA-79102302-4
Included in Fishery Bulletin, V77 n2 p387-398 Apr 79.

Stocks of fish can occur in mixtures, and knowledge of the composition of such a mixture may be needed. An estimate of the proportion of the mixture arising from each stock potentially present as well as a measure of the precision of this estimate may suffice. Using the numbers of individuals in each test sample and sample of the mixture which are assigned to each stock, the authors can estimate the composition of the mixture and the precision of this estimation.

PB80-131287
(Order as PB80-131238, PC **A10**/MF **A01**)
State Univ. of New York at Stony Brook.
Behavior and Ecology of the Bottlenose Dolphin, 'Tursiops truncatus', in the South Atlantic,
Bernd Wursig, and Melany Wursig. Apr 79, 15p NOAA-79102302-5
Included in Fishery Bulletin, v77 n2 p399-412 Apr 79.

Bottlenose dolphins observed nearshore in Golfo San Jose, Argentina, spent 92% of their time in water less than 10 m deep. They moved into deeper water, up to 39 m depth, mainly during midday in nonsummer for brief (16 min) periods. They moved more rapidly in deeper water, and may have been feeding on schooling fish at that time. During summer they stayed in shallow water, 2-6 m deep. Dolphins moved parallel to shore and in consistent depth of water at almost all times. Slow movement and apparent resting occurred mainly during the morning, while most aerial behavior, apparent sexual and social behavior, and rapid-movement feeding occurred in the afternoon.

PB80-131295
(Order as PB80-131238, PC **A10**/MF **A01**)
National Marine Fisheries Service, La Jolla, CA. Southwest Fisheries Center.
Growth of Northern Anchovy, 'Engraulis mordax', Larvae in the Sea,
Richard D. Methot, Jr., and David Kramer. Apr 79, 12p NOAA-79102302-6
Included in Fishery Bulletin, v77 n2 p413-423 Apr 79.

Northern anchovy larvae from 12 samples collectd at 13.0-16.2C in the Southern California Bight were aged using daily growth increments in sagittal otoliths, and growth rates were calculated from size at age data. In nine samples, growth rate at 8 mm was very similar, ranging from 0.34 to 0.40 mm per day. Growth in the other three samples ranged from 0.46 to 0.55 mm per day. In no case was growth in the sea as slow as growth in the laboratory on severely limited rations. Anchovy larvae which obtain enough food to survive apparently obtain enough food to grow rapidly.

PB80-131311
(Order as PB80-131238, PC **A10**/MF **A01**)
Virginia Inst. of Marine Science, Gloucester Point.
Some Aspects of the Biology of Deep-Sea Lobsters of the Family Polychelidae (Crustacea, Decapoda) from the Western North Atlantic.
Elizabeth Lewis Wenner. Apr 79, 11p CONTRIB-881, NOAA-79102302-8
Grant NSF-OCE77-05698
Included in Fishery Bulletin, v77 n2 p435-444 Apr 79.

Stereomastis nana was the most abundant species of Polychelidae collected by otter trawl on the continental slope of the Middle Atlantic Bight, off the eastern United States. Total catches were almost four times greater than those of its congener, S. sculpta.

PB80-131329
(Order as PB80-131238, PC **A10**/MF **A01**)
National Marine Fisheries Service, Narragansett, RI. Narragansett Lab.
Reproduction in the Blue Shark, 'Prionace glauca',
Harold L. Pratt, Jr. Apr 79, 27p NOAA-79102302-9
Included in Fishery Bulletin, v77 n2 p445-470 Apr 79.

In the male blue shark, Prionace glauca, paired testes produce spermatozoa year round which are stored first in the epididymides, then as spermatosphores in the lower ductus deferentia. Spermatozoa are transferred to the female through paired claspers employed singly. Reproductive organs were examined from 160 subadult female blue sharks, caught in shelf waters off southern New England during summer months, by histological sectioning to determine if spermatozoa were present. Of these females, 79 had spermatozoa in the oviducal gland, establishing successful copulation. Inseminated females then emigrate offshore where fertilization occurs the following spring

during ovulation. Blue sharks are viviparous and bear young after 9 to 12 months gestation.

PB80-134448 PC **A03/MF A01**
Tennessee Wildlife Resources Agency, Nashville.
Parasites and Diseases of Cultured Fishes.
Completion rept. Jul 75-Jun 79,
J. A. Plumb, W. A. Rogers, and J. P. Hawke. Oct 79, 42p NOAA-79121102
Prepared in cooperation with Auburn Univ., AL.

From July 1, 1975 to June 30, 1979 a total of 534 fish disease cases from commercially oriented sources were processed. Channel catfish was the predominant species being involved in 309 cases and constituting 78% of the total. Eight other groups or species of fish were recorded. There were 20 virus disease cases, primarily channel catfish virus, but a new virus from golden shiners was found and described. Bacteria were involved in 164 cases. Aeromonas hydrophila and Flexibacter columnaris were the most common causes of bacterial infection (77% of the bacterial cases). Eight other bacterial diseases were recorded including an apparently new disease caused by an organism similar to, but distinct from, Edwardsiella tarda. Parasites contributed to 114 cases. Multiple protozoan infestations were the most numerous followed by Ichthyobodo (Costia) and Ichthyophthirius. The miscellaneous category included 231 cases, many of which were routine examinations and losses due to unknown causes. One new species of Trichodina was described and one previously described species of Trichodina found infesting catfish is redescribed.

PB80-135031 PC **A02**
Woods Hole Oceanographic Institution, MA.
The Filter-Feeding Rates and Particle Retention Efficiencies of Three Species of 'Cyclosalpa' (Tunicata, Thaliacea),
G. R. Harbison, and V. L. McAlister. c1979, 20p WHOI-CONTRIB-4144, NOAA-79120705
Grant NOAA-04-6-158-44072
Pub. in Limnology and Oceanography, v24 n5 p875-892, 1979.

The particle retention spectra of the mucous nets of three species of salps were determined by measuring differences in grazing rates on particles of different sizes with a Coulter Counter. It is pointed out that the only correct method for determining these spectra for an organism feeding in a closed vessel is to compare rates of clearance for each particle size class; if ratios of the quantity ingested to the initial amount in each size class are used, incorrect retention spectra will be produced. Cyclosalpa floridana, Cyclosalpa affinis, and Cyclosalpa polae can all remove particles about 4 micron in diameter and larger with 100% efficiency. Observed differences between species in the retention characteristics of the filtration apparatus can be ascribed to differences in the sizes of the animals. In general, smaller salps can retain a greater fraction of small particles than can larger ones. Although quantitative differences in the particle retention spectra between generations and species exist, there is little evidence that qualitative differences are also present. Depending on the abundance of these salps, their grazing impact on particles with diameters as small as 1 micron could be significant. (Copyright Limnol. Oceanogr., 24(5), 1979, 875-892 (c) 1979, by the American Society of Limnology and Oceanography, Inc.)

8B. Cartography

AD-A078 400/9 PC **A03/MF A01**
Electronics Research Lab Adelaide (Australia)
A Procedure for Producing a Terrain Elevation Grid from Map Contour Data.
Technical rept.,
M. J. Dowling. Jun 79, 50p Rept no. ERL-0085-TR

A common method of representing the shape of the terrain, for use in various simulations or digital computer assisted studies, is to record the height of the terrain at regular intervals over a 2-dimensional grid and store this information in the computer. Manual interpolation of contour data from surveys maps, to obtain the data for the grid, is a laborious and error-prone process. This report describes an improved procedure for producing the terrain height grid. It involves a sonic digitizer to record a set of (X, Y) coordinates along the contour lines shown on the survey map. This information is stored in a disk file on a computer, and a two-stage cubic spline interpolation procedure is used to determine the terrain height at the intersection points of the nominated grid. The set of computer programs developed to implement the procedure with minimal storage requirements is described and listed. (Author)

N80-14426/4 PC **A03/MF A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
SCANLINE: A Computer Program for Converting Raster Maps into Line Maps.
C. S. M. Mueller, and A. H. J. Christensen. Sep 78, 42p CSIR-TWISK-43

A computer program, algorithms and techniques are described that can be used for transforming a map digitized on a raster scanner, in bit matrix form, into a line map represented by a set of vectors, which is a format very suitable for processing by computer. By means of such a program and techniques of this kind, the conversion of a very large number of existing cartographic maps into digital line maps becomes economically feasible.

N80-14427/2 PC **A10/MF A01**
Institut fuer Angewandte Geodaesie, Frankfurt am Main (Germany, F.R.).
Information on Cartography and Geodesy. Series 1: Original Report Number 75.
1978, 218p
Misc-Original Contains Color Illustrations. Text in German; English Summary.

No abstract available.

N80-14462/9 PC **A06/MF A01**
Institut fuer Angewandte Geodaesie, Frankfurt am Main (Germany, F.R.).
On the Use of Digital Photogrammetric Measurements in the Compilation of Topographic Maps Beitraege Zur Digitalen Photogrammetrischen Messung fuer die Herstellung Topographischer Karten.
H. G. Neubauer. 1978, 125p SER-1-ORIGINAL-REPT-76
Misc-Original Contains Color Illustrations. Text in German; English Summary.

The preparation of topographic maps is discussed. The technique where topographic maps are first prepared in the form of graphic manuscripts by applying photogrammetric methods is briefly reviewed. It is shown that attempts at a rationalization of map production leads, with the aid of digital data, to automated procedures. The measurements, the computations by means of electronic data processing equipment, and the output of field comparison documents are discussed.

PB80-130719 PC **A06/MF A01**
State Univ. of New York Coll. of Environmental Science and Forestry, Syracuse. School of Landscape Architecture.
Landscape Visibility Mapping: Theory and Practice,
John P. Felleman. 1979, 125p NOAA-79120704

Visibility deals with both the geographic extent of surfaces which can be seen, and the legibility of features which, in composite visibility mapping, provides the basis for human perception and cognition of landscapes. Geographic extent of visibility is the primary emphasis of this monograph. The purposes of this report are: to develop a coherent, conceptual construct of landscape visibility mapping; to systematically articulate the alternative methods of data organization, and visibility mapping through the use of selected illustrated examples; and to foster improved integration of visibility information into complex resource planning and project design. Included in the report are: a working definition of a comprehensive visibility model, a discussion of data assembly for the elements of the visibility model, line-of-sight processing methods for stationary position and for moving observers, and visibility study outputs, plan views and perspectives.

PB80-804297 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Computer Aided Mapping (Citations from the NTIS Data Base).
Rept. for 1976-79,
Brian Carrigan. Feb 80, 181p
For the companion Published Search of the Engineering Index Data Base, see PB80-804305.

Federally-sponsored research on the application of computer techniques to cartography is cited. Automatic mapping, geographic data bases, and computerized photomapping are included. (Contains 174 abstracts)

PB80-804305 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Computer Aided Mapping (Citations from the Engineering Index Data Base).
Rept. for 1970-79,
Brian Carrigan. Feb 80, 154p
For the companion Published Search of the NTIS Data Base, see PB80-804297.

Research on the application of computer techniques to cartography is cited from the worldwide journal literature. Automatic mapping, geographic data bases, and computerized photomapping are included. (Contains 147 abstracts)

8C. Dynamic Oceanography

AD-A078 294/6 PC **A03/MF A01**
Phoenix Corp McLean VA
Validation of Ocean Tide Models from Satellite Altimetry.
Interim rept. May-Oct 78,
R. D. Brown. 15 Oct 79, 36p
Contract N00014-79-C-0409

Tides in the deep ocean can be determined directly from satellite altimetry, completely independent of assumptions about earth tides, bottom topography and coastal geometry and thus free of the uncertainties which plague numerical tide models. Existing tide models differ by 1 meter or more in the value of sea surface height in the deep ocean at a given place and time. This uncertainty is a formidable obstacle to determination of a precise marine geoids from satellite altimetry. By harmonic analysis of the temporal changes in altimeter measurements at satellite subtrack crossover points, it is possible to solve for the amplitude and phase of harmonic tidal components. However, care must be exercised in the removal of satellite orbit errors, and in the selection of crossovers for sufficient observability of the phase angle of the harmonic tidal component. Preliminary tidal solutions in the Gulf of Alaska using the relatively sparse GEOS-3 altimeter data distribution show generally good agreement (20 cm in amplitude and 25 degrees in phase) with deep ocean bottom pressure gauge measurements and establish the feasibility of this technique. SEASAT altimeter data yields a much greater density of crossovers (400 plus per 1/2 deg by 1/2 deg area), making possible much better separation of individual harmonic components within the semi-diurnal and diurnal families.

AD-A078 366/2 PC **A02/MF A01**
Office of Naval Research London (England)
Research at the Bidston Branch of the UK Institute of Oceanographic Sciences,
Wayne V. Burt. 7 Aug 79, 9p Rept no. ONRL-R-4-79
See also AD-159 589.

The background of IOS Bidston is presented along with a short history of its predecessors, the Liverpool Observatory, the Liverpool Tidal Institute, and the Institute of Coastal Oceanography and Tides. Ongoing research programs at IOS Bidston are described. (Author)

AD-A078 387/8 PC **A02/MF A01**
Stanford Univ CA Center for Radar Astronomy
A Short Bibliography of Russian Literature in Radio Oceanography,
John F. Vesecky. 1978, 5p
Contract N00014-78-C-0046
Pub. in Boundary-Layer Meteorology, v13 p427-429 1978.

No abstract available.

AD-A078 834/6 PC **A07/MF A01**
Stanford Univ CA Stanford Electronics Labs

Remote Sensing of Ocean Surface Current and Current Shear by HF Backscatter Radar.
Technical rept.,
Eng-Chong Ha. Aug 79, 150p Rept nos. SU-SEL-79-022, TR-D415-1
Contract N00014-75-C-0356

The Doppler spectrum of radar return from the sea at HF contains two narrow lines displaced upward and downward from the carrier frequency, resulting from backscatter off ocean surface waves moving toward and away from the radar, respectively. These Bragg lines indicate resonant backscatter which occurs for the ocean waves of length one-half the radio wavelength. The phase velocity of these gravity waves consists of two components; the first is determined by the wavelength and the second by the current component in the direction of wave propagation averaged over depth with an exponential weighting function that has a characteristic scale proportional to the wavelength. The Doppler shift of the radar carrier is determined by the wave phase velocity. Its variation with carrier frequency is thus related to the vertical profile of the current component in the radar direction by a Laplace transform; therein lies the principle of radio measurement of ocean current and its vertical shear. Radio backscatter experiments to verify the feasibility of such measurements were conducted using the radar operating at four frequencies covering the range from 3 to 30 MHz. The depth-averaged radial current deduced from the centroid of the Doppler-shifted sea echo experiments at 6.8, 13.3, 21.7, and 29.8 MHz showed fluctuations on the order of 1 cm/sec superimposed on temporal trends that reached maximum values of about 40 cm/sec. It is concluded that multifrequency backscatter ground-wave radar at HF constitutes a powerful technique for mapping current and its vertical profile in the top few meters of the ocean.

PB80-130081 PC **A99**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Volume IX. Transport.
Oct 78, 764p NOAA-79101610
Prepared in cooperation with Bureau of Land Management, Washington, DC.

As part of the Outer Continental Shelf Environmental Assessment Program this volume contains the following annual reports for the year ending March 1978: HF surface-current mapping radar 1977 Alaskan operations--Lower Cook Inlet; Current measurements in possible dispersal regions of the Beaufort Sea; Gulf of Alaska shelf circulation; Alaska numerical modeling; Bristol Bay oceanographic processes and, Study of climatic effects on fast ice extent and its seasonal decay along the Beaufort-Chukchi coasts.

PB80-804115 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Ocean Current Sensors (Citations from the NTIS Data Base).
Rept. for 1964-79,
Robena J. Brown. Feb 80, 123p
Supersedes NTIS/PS-79/0001.

The bibliography cites research covering measurement techniques and design of ocean current sensors. The studies cover such topics as equipment comparisons, calibration techniques, mooring studies, and accuracy evaluation. Reports on remote sensing techniques for current measurement have been excluded. (This updated bibliography contains 116 abstracts, 8 of which are new entries to the previous edition.)

8E. Geodesy

AD-A078 760/6 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory Palisades NY
Comparison of Gravimetric Geoids with GEOS 3 Altimetric Geoid.
Journal article,
Michael E. Champman, and Manik Talwani. 8 Jun 78, 16p Rept no. LDGO-2813
Contracts N00014-75-C-0210, NAS6-2519
Pub. in Jnl. of Geophysical Research, v84 nB8 p3803-3816, 30 Jul 79.

No abstract available.

8F. Geography

AD-A078 940/4 PC **A04**/MF **A01**
Washington Univ Seattle Dept of Geography
Preliminary Investigations of the Geographic Applications of Holography.
Final rept.,
Carl E. Youngmann. Apr 75, 58p
Contract N00014-67-A-0103-0033

This report provides an introduction to optical holography and its applications in Geography. The nature of the holographic process is explained and its advantages and disadvantages are considered. The forms and formats of spatial data are examined in respect to the requirements for a holographic data storage systems. Digital-optical interfaces allow the creation of hybrid computing devices and three applications of these to spatial analysis and data display are indicated. The relationship of holographic theory to associative data structures also is considered. (Author)

E79-10082 PC **A10**/MF **A01**
California Univ., Berkeley. Space Sciences Lab.
An Integrated Study of Earth Resources in the State of California Using Remote Sensing Techniques.
Annual progress rept.,
Robert N. Colwell, Ralph Algazi, Leonard W. Bowden, John E. Estes, and Ida R. Hoos. 1 May 78, 223p NASA-CR-158080
Original contains imagery. Original photography may be purchased from EROS Data Center, Sioux Falls, SD. 57198.

No abstract available.

N80-14760/6 PC **A14**/MF **A01**
IBM Federal Systems Center, Gaithersburg, MD.
On-Board Multispectral Classification Study.
D. Ewalt. Dec 79, 307p NASA-CR-3134
Contract NAS1-15119

The factors relating to onboard multispectral classification were investigated. The functions implemented in ground-based processing systems for current Earth observation sensors were reviewed. The Multispectral Scanner, Thematic Mapper, Return Beam Vidicon, and Heat Capacity Mapper were studied. The concept of classification was reviewed and extended from the ground-based image processing functions to an onboard system capable of multispectral classification. Eight different onboard configurations, each with varying amounts of ground-spacecraft interaction, were evaluated. Each configuration was evaluated in terms of turnaround time, onboard processing and storage requirements, geometric and classification accuracy, onboard complexity, and ancillary data required from the ground.

8G. Geology and Mineralogy

AD-A078 757/2 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory Palisades NY
Disappearance of Pink-Pigmented Globigerinoides ruber at 120,000 yr BP in the Indian and Pacific Oceans.
Journal article,
Peter R. Thompson, Allan W. H. Be, Jean-Claude Duplessy, and Nicholas J. Shackleton. 29 May 79, 6p Rept no. LDGO-2876
Contract N00014-75-C-0210, Grant NSF-GA-38276
Sponsored in part by Grants NSF-OCE78-25450, NSF-OCE75-18136, NSF-OCE77-22893 and NSF-OCE78-18049. Pub. in Nature, v280 n5723 p554-558, 16 Aug 79.

No abstract available.

AD-A078 758/0 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory Palisades NY
A Transfer Function for Estimating Paleoceanographic Conditions Based on Deep-Sea Surface Sediment Distribution of Radiolarian Assemblages in the South Atlantic.
Journal article,
Joseph J. Morley. 2 May 78, 17p Rept no. LDGO-2865
Contract N00014-75-C-0210, Grant NSF-GX-28671
Sponsored in part by Grants NSF-OCE76-18049 and NSF-OCE75-19627. Pub. in Quaternary Research, v12 p381-395 1979.

No abstract available.

AD-A078 759/8 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory Palisades NY
Relationships between Acoustic Stratigraphy and Lithostratigraphy in the Western North Atlantic Basin.
Journal article,
Brian E. Tucholke. 1979, 22p Rept no. LDGO-2514
Contract N00014-75-C-0210, Grant NSF-GA-27284
Pub. in Initial Reports of the Deep Sea Drilling Project, v43 p827-846 1979. Sponsored in part by Grant NSF-OCE76-02038.

No abstract available.

AD-A078 776/2 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab Hanover NH
Electron Microscope Investigations of Frozen and Unfrozen Bentonite,
Motoi Kumai. Nov 79, 20p Rept no. CRREL-79-28

Transmission and scanning electron micrographs of Umiat bentonite revealed thin, mica-like grains with irregular shapes. Most of the bentonite showed electron diffraction ring patterns, but some showed hexagonal net patterns as well as ring patterns. The lengths of the unit cells were calculated to be 5.18 A along the a-axis and 8.97 A along the b-axis. Semiquantitative analyses were made using an energy dispersive spectrometer. Common elements such as Si, Ti, Al, Fe, Mg, Na and K were determined. The molecular ratio of SiO2:Al2O3 was calculated to be 492:100 for the bulk sample, indicating that Umiat bentonite is similar in most respects to Wyoming bentonite, and is classified as a mont-morillonite. The microstructure of frozen Umiat bentonite was observed at a specimen temperature of -100 C using a scanning electron microscope equipped with a cold stage. Frozen bentonite and segregated ice patterns formed from wet bentonite were examined using an X-ray map and Si X-ray line scan. Sublimation processes of ice in the frozen bentonite were observed at specimen temperatures of -60 and -80 C. After sublimation of the ice the bentonite displayed a honeycomb structure. It was concluded that the freezing-sublimation cycle in frozen soil increases the permeability of water vapor due to the three-dimensional structure of the coagulated clay formed by freezing. (Author)

E79-10160 PC **A02**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Geologic Application of Thermal Inertia Imaging Using HCMM Data.
Quarterly rept. Oct-Dec 78,
Helen N. Paley, and Ann B. Kahle. Feb 79, 15p NASA-CR-157446
Original contains imagery. Original photography may be purchased from EROS Data Center, Sioux Falls, SD. 57198.

The author has identified the following significant results. The day infrared and visible HCMM satellite data for Death Valley taken on 31 May 1978 were compared with aircraft data of the same area taken in March of the same year. In the visible image, it is possible to note the drying of the valley floor during the two month period between acquisition of the two data sets. On the IR image however, the valley floor remains cool, probably indicating that while the standing water has disappeared, the floor is still moist.

PAT-APPL-945 436 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Pasadena Office, CA.

Geological Assessment Probe.
Patent Application,
E. R. Collins. Filed 25 Sep 78, 16p N80-12642/8, NASA-CASE-NPO-14558-1
Subm-Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A probe is described which can be installed in a side hole that extends from a bore hole in the earth, to assess the permeability of the strata surrounding the borehole. The probe is elongated and has seals spaced the walls of the side hole to form chambers sealed from one another. A tracer fluid injector on the probe can inject a tracer fluid into one of the chambers, while a tracer fluid detector located in another chamber can detect the tracer fluid, to thereby sense the permeability of the strata surrounding the side hole. The probe can include a train of modules, with each module having an inflatable packer which is inflated by the difference between the borehole pressure and the strata pressure.

PB80-137730 PC **A02**
Woods Hole Oceanographic Institution, MA. Dept. of Geology and Geophysics.
The Geologic History of the Passive Margin Off New England and the Canadian Maritime Provinces.
Elazar Uchupi, and James Albert Austin, Jr. c9 Mar 79, 19p WHOI/CONTRIB-4225, NOAA-79120708
Grant NSF-IDO74-04094
Pub. in Tectonophysics, v59 p53-69 1979.

The geologic history of the passive continental margin off the east coast of North America from New England to Newfoundland is described using all available geological and geophysical information. 'Rift' and 'drift' phases of the margin's evolution are recognized, with rifting initiated in Late Triassic and completed by Early Jurassic. The plate decoupling process created a complex block-faulted terrain as a result of uplift and tensional fracturing. The approximate plane of continental separation is marked by a 'hinge zone' characterized by a pronounced steepening of basement gradients. This 'drift' sequence attains its maximum thickness in the vicinity of the continental slope, and thins both landward and seaward. On the shelf, this unit consists of Mesozoic evaporites, carbonates, and deltaic deposits. Overlying these sediments is a prograding wedge of Cenozoic clastics. On the rise, the Mesozoic sediments are evaporites, hemipelagic limestones and shales, and carbonaceous clays. The Cenozoic is dominantly terrigenous material. Separating these two sedimentary provinces is the continental slope, a site of major facies changes and a Mesozoic reef complex.

PB80-804529 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Tectonics. Volume 2. 1975-January, 1980 (Citations from the NTIS Data Base).
Rept. for 1975-Jan 80,
Audrey S. Hundemann. Feb 80, 273p
Supersedes NTIS/PS-79/0089, NTIS/PS-78/0082, and NTIS/PS-77/0088. See also Volume 1, 1973-1974, NTIS/PS-76/0091.

Abstracts dealing with plate tectonics, remote sensing of terrain features, geologic faults, ocean bottom spreading, geomagnetic anomalies, paleomagnetism, and geomorphology are cited. (This updated bibliography contains 266 abstracts, 26 of which are new entries to the previous edition.)

8H. Hydrology and Limnology

AD-A078 771/3 PC **A05**/MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Material Transport in River Systems during Storm Events by Water Routing.
Final technical rept.,
Frank Verhoff, and David Melfi. Mar 79, 80p

Flow and water quality data (starting in 1976) have been collected, analyzed, and plotted at nine USGS gaging stations in the Sandusky River of northern Ohio for several storm events. A procedure has been developed whereby the water as it travels downstream is followed. The calculational procedure is further expanded to include the tracing of conservative water chemistry as it moves downstream. Thus, at a downstream station it is possible to predict such water quality parameters and compare them with their measured values. The conservative substances such as chlorides and conductivity compared well-- such substances indicating these are not conservative and that deposition and resuspension occur in various reaches of the stream. Further, the methodology permits the estimation of the fractions of these substances at a given downstream station which are derived from various upstream sources. Various factors such as point sources, river flow rate, etc., are discussed as to how they affect the transport of total phosphorus, suspended solids, chlorides, conductivity, the nitrogen species, and other water quality parameters. (Author)

AD-A078 784/6 PC **A04**/MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Chemical Extraction AS AN Index of Bioavailability of Phosphate in Lake Erie Suspended Sediments.
Final rept.,
Terry J. Logan. Jan 78, 55p

The objectives of this report are: a. to characterize the phosphorus contained in suspended sediments from streams draining into Lake Erie. b. To study the differences in suspended sediment phosphorus entering Lake Erie in streams from different drainage basins. c. To estimate the bioavailability of phosphorus to aquatic plants from suspended sediments in streams draining into Lake Erie. (Author)

PB80-804123 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Reservoir and Lake Sedimentation (Citations from the NTIS Data Base).
Rept. for 1964-Jan 80,
Robena J. Brown. Feb 80, 86p
Supersedes NTIS/PS-79/0022 and NTIS/PS-78/0021.

The build-up and effects of sedimentation in reservoirs and lakes are cited. Reports on silting, control techniques, and causes are included. (This updated bibliography contains 79 abstracts, 8 of which are new entries to the previous edition.)

8I. Mining Engineering

PB80-119514 PC **A03**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Mineral Engineering.
Evaluation of Coal Mine Electrical System Safety.
Annual progress rept. 1 Jan-31 Dec 77,
Lloyd A. Morley, Frederick C. Trutt, and Jeffrey L. Kohler. 31 Jan 78, 46p BUMINES-OFR-117-79
Grant G0155003
See also PB-283 497.

This report contains four principal chapters covering accomplishments in the mine electrical safety research areas of continuous monitoring, battery and battery-charging safety, and computer modeling. Highlights of the work are summarized in the last report chapter.

PB80-122690 PC **A02**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Mining and Safety Research Center.
Directional Drilling for Coalbed Degasification. Program Goals and Progress in 1978.
Report of investigations,
David C. Oyler, William P. Diamond, and Paul W. Jeran. 1979, 21p BUMINES-RI-8360

The Bureau of Mines is cooperating with the U.S. Department of Energy in a directional degasification project at the Emerald mine near Waynesburg, Pa. This project is designed to combine the highly successful underground horizontal desgasification technology with surface drilling methods. The objective of this program is to demonstrate that directional drilling can be used as a technique for degasifying coalbeds ahead of mining to reduce the hazards of methane-air explosions in coal mines.

PB80-122732 PC **A02**/MF **A01**
Bureau of Mines, Salt Lake City, UT. Salt Lake City Metallurgy Research Center.
Bench-Scale Flotation of Insoluble Slimes From Potash Ore.
Rept. of investigations 1979,
Philip Thompson, and Jerry L. Huiatt. 1979, 22p BUMINES-RI-8384

A part of the Bureau of Mines mission is to help improve the Nation's mineral posture by providing the technology for utilizing low-grade ores. In this regard, laboratory testing by the Bureau of Mines has shown that the removal of insoluble slimes using selective flocculation and flotation is a viable method for treating low-grade potash ores that have a high content of water-insoluble impurities. Results indicated that over 82 percent of the insoluble slimes could be removed from sylvinite ore containing 5 percent water insolubles and 13 percent K sub O by using nonionic or cationic polyacrylamide flocculants and cationic, anionic, and/or nonionic collectors. Subsequent potash flotation recovered 87 percent of the potash in rougher concentrates containing 57 percent K sub O. Sizing and cleaner flotation of the rougher concentrates upgraded the products to 60 percent K sub O. Filtration of the water-leached insoluble-slimes flotation concentrates on a bed consisting of leached insoluble-slimes concentrate mixed with potash flotation tailings recovered 80 percent of the brine. Filtration rates using the mixed bed were nine times faster than filtration rates obtained when the insoluble-slimes flotation concentrates were filtered separately.

PB80-123557 PC **A07**/MF **A01**
PEDCo-Environmental, Inc., Cincinnati, OH.
Evaluation of Fugitive Dust Emissions from Mining.
Rept. on Task 1 and 2.
Apr 76, 141p
Contract EPA-68-02-1321

This evaluation of fugitive dust air pollution from mining operations was undertaken to identify and compile currently available information on emission sources, regulatory approaches, control techniques, and research programs related to mining activities. An analysis of the assembled information will then be used as the basis for recommending near-term research and development programs which might be implemented by IERL-Cincinnati to fill gaps in the data base and further document effective control techniques for fugitive dust from mining operations. For the more promising recommended R and D efforts, proposed technical approaches will also be developed. This project is composed of three tasks: Task (1) Identification of fugitive dust sources associated with mining activities; Task (2) Assessment of current status of the environmental aspects of fugitive dust; Task (3) Recommendation of promising research areas. Tasks 1 and 2 are presented in this report.

PB80-124837 PC **A13**/MF **A01**
Central Research and Design Inst. for Open-Pit Mining, Wroclaw (Poland).
Coal Surface Mining and Power Production in the Face of Environmental Protection Requirements.
Jacek Libicki. Oct 79, 293p EPA/600/7-79-159
Contract EPA-J-5-533-12
Proceedings of the United States-Polish Symposium (2nd) Held at Castel Ksiaz, Poland on September 26-28, 1979.

A partial listing of topic areas includes: Overview of the United States environmental research program related to coal extraction conversion through the year 2000; Present and future role of lignite in Polish power production and basic problems of environmental protection; Legislation and regulations controlling coal extraction and conversion in the United States; Present and future surface coal extraction technologies in the United States; Surface mining of lignite with belt conveyors and its environmental advantages; Coal mining and ground water; The impact of lignite mining on surface water and means of its control; Coal refuse disposal practices and challenges in the United States; Reclamation practices for coal refuse and fly ash disposal; Successful revegetation of coal-mined lands in the United States; Efforts of agricultural reclamation of toxic spoils in lignite surface mining

in Poland; Selected problems of environmental protection in designing coal fired power - plants and high tension systems; Air pollution in the vicinity of large thermal power plants and control.

PB80-134224 PC A02/MF A01
Bureau of Mines, Washington, DC.
Mica,
Alvin B. Zlobik. Oct 79, 24p
Report on Mineral Commodity Profiles.

Mica has been serving people in many ways since 2000 B.C., when Hindu doctors used it as medicine. Sheet mica is used extensively in the electrical and electronic industries. Scrap, flake, and ground micas are used primarily in the construction industry, but uses also include well-drilling muds and high-quality paints. Principal commercial varieties of mica are muscovite and, to a lesser extent, phlogopite. The report presents comprehensive data on mica including industry structure, uses, reserves-resources, technology, supply-demand relationships, byproducts and coproducts, strategic considerations, economic factors and problems, operating factors and problems, and outlook to 2000.

PB80-134232 PC A03/MF A01
Bureau of Mines, Washington, DC.
Cobalt,
Scott F. Sibley. Oct 79, 28p
Report on Mineral Commodity Profiles.

Cobalt, a little-known but strategic metal, has been developed through the centuries from an obscure coloring additive into an essential element in many alloys and an important ingredient in chemical compounds. Moreover, cobalt is one of several vital alloying elements in the aerospace and electrical-product industries. In most of its alloying applications, cobalt imparts essential qualities such as heat resistance, high strength, wear resistance, and superior magnetic properties. Major uses include cutting tools, jet engine parts, electrical devices, permanent magnets, catalysts, and pigments and dryers for paints and allied products. The report presents comprehensive data on cobalt including industry structure, reserves-resources, technology, supply-demand relationships, strategic considerations, economic factors and problems, toxicity, and outlook to 2000.

PB80-134430 PC A04/MF A01
General Accounting Office, Washington, DC. Energy and Minerals Div.
Geothermal Energy: Obstacles and Uncertainties Impede Its Widespread Use.
Report to the Congress.
18 Jan 80, 51p EMD-80-36

This report discusses the obstacles and uncertainties impeding the widespread use of geothermal energy. It includes a perspective on geothermal energy's development and potential, and a discussion of Federal actions needed to help accelerate geothermal development and use.

PB80-804061 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Mine Ventilation (Citations from the NTIS Data Base).
Rept. for 1964-Jan 80,
Audrey S. Hundemann. Feb 80, 187p
Supersedes NTIS/PS-79/0083, NTIS/PS-78/0159 and NTIS/PS-77/0170.

Air flow, environmental monitoring systems, dust and mine gases measurement and control, and computerized simulation studies of mine ventilation are presented. Most abstracts pertain to coal mine ventilation. (This updated bibliography contains 180 abstracts, 26 of which are new entries to the previous edition.)

PB80-804404 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Coal Mine Waste (Citations from the NTIS Data Base).
Rept. for 1964-Jan 80,
Audrey S. Hundemann. Feb 80, 202p
Supersedes NTIS/PS-79/0080, NTIS/PS-78/0052, and NTIS/PS-77/0040.

Research topics cover coal mining refuse, refuse dumps, and spoil. Studies on disposal, utilization, environmental impacts, and testing of these wastes are included, as are reports on land reclamation and spoil bank safety. (This updated bibliography contains 195 abstracts, 36 of which are new entries to the previous edition.)

8J. Physical Oceanography

AD-A078 386/0 PC A02/MF A01
Massachusetts Inst of Tech Cambridge Dept of Earth and Planetary Sciences
Mantle Convection and the Thermal Structure of the Plates,
Barry Parsons, and Dan McKenzie. 5 Jul 77, 14p
Contract N00014-75-C-0291
Pub. in Jnl. of Geophysical Research, v83 nB9 p4485-4496, 10 Sep 78.

No abstract available.

AD-A078 526/1 PC A04/MF A01
American Inst of Biological Sciences Arlington VA
Symposium on Dissertations on Chemical Oceanography, October 8-12, 1979.
1979, 75p
Contract N00014-78-C-0140

Contents: Ion Association and Activity Coefficients in Electrolyte Solutions; Activity Effects in Seawater and Other Saline Mixtures; Volatile Organic Compounds in Seawater; The Interactions between Copper and Organic Matter in Coastal Seawater; Vertical Transportation of Organic Materials in Oceanic Environments; An Investigation of Vertical Mixing Rates in Fjords Using Naturally Occurring Radon-222 and Salinity as Tracers; The Geochemistry of Radium-226 and Radium-228 in Marine Deposits; The Dissolution Kinetics of Biogenic Calcium Carbonate; Sedimentary Geochemistry of Hydrocarbons from Narragansett Bay, Rhode Island; Early Diagenesis of Trace Metals in Nearshore Long Island Sound Sediments; Rates of Sediment Accumulation and Their Bearing on Metallogenesis on the Nazca Plate, Southeast Pacific; Discrete Suspended Particles of Barite and the Barium Cycle in the Open Ocean; Trace Metal-Organic Matter Interactions in Anoxic Marine Sediments during Early Diagenesis; Factors Influencing the Phase Partitioning of Iron and Associated Elements during Early Diagenesis in Shallow Marine Sediments; The Chemistry of Salt Marsh Sediments; Benthic Nutrient Regeneration and Sediment-Water Exchange in an Organic-Rich Coastal Sediment Cape Lookout Bight, North Carolina; The Role of Zooplankton Fecal Material in the Cycling and Deposition of Particulate Matter in an Estuarine and Deep-Oceanic Region of the North Eastern Pacific Ocean.

AD-A078 661/6 PC A11/MF A01
Woods Hole Oceanographic Institution MA
ATLANTIS-II (Cruise 102) Preliminary CTD Data from JASIN 1978.
Technical rept.,
Nancy Pennington, and Melbourne G. Briscoe.
Dec 79, 250p Rept no. WHOI-79-42
Contract N00014-76-C-0197, Grant NSF-OCE77-25803

102 Profiles of conductivity, temperature, and depth (pressure) (CTD) were taken in the JASIN area northwest of Scotland in July-September 1978. These stations consisted od single and yo-yo profiles. The data set includes 14 stations taken near Anton Dohrn Seamount at 57 deg 30 min N, 11 deg W. Plotted profiles of temperature, salinity, sigma-theta, and buoyancy frequency, and a listing of the data, are included for most stations. (Author)

AD-A078 741/6 PC A02/MF A01
Oregon State Univ Corvallis School of Oceanography
EXPOSURE. A Newsletter for Ocean Technologists. Volume 7, Number 4,
Rod Mesecar. Sep 79, 8p

No abstract available.

AD-A078 756/4 PC A02/MF A01
Lamont-Doherty Geological Observatory Palisades NY
Experimental Studies of Attenuation in Sediments.
Journal article,
Robert D. Stoll. 23 Jan 79, 10p Rept no. LDGO-2847
Contract N00014-75-C-0210
Pub. in Jnl. of Acoustical Society of America, v66 n4 p1152-1160 Oct 79.

No abstract available.

AD-A078 810/9 PC A05/MF A01
Oregon State Univ Corvallis School of Oceanography
Optical and Hydrographical Observations Off the Coast of Peru during May - June 1977,
Hasong Pak, David Menzies, and J. Ronald V. Zaneveld. Oct 79, 98p Rept nos. DATA-77, REF-79-14
Contract N00014-76-C-0067

During the WELOC-77 cruise, May 21 - June 18, 1977, hydrographic and light beam transmission measurements were simultaneously made in situ off the coast of Peru on R/V WECOMA. Temperature, salinity and light transmission data are listed for standard depths, and their vertical profiles are also presented. (Author)

N80-14660/8 PC A07/MF A01
World Meteorological Organization, Geneva (Switzerland).
Compendium of Meteorology for Use by Class One and Class Two Meteorological Personnel. Volume 2, Part 3: Marine Meteorology.
A. Win-nielsen, and R. Fotheringham. 1979, 130p
WMO-364
Seri-2.

Lecture notes in marine meteorology based on corresponding syllabi for the fundamental training of class one and class two personnel are given. The following areas are covered: physical properties of sea water; dynamics of the upper ocean; heat balance of the ocean; air-sea interaction; water masses, oceanic fronts and thermoclines; platforms and instruments; ocean resources; sea ice; sea waves; swells; tsunamis and storm surges; and underwater acoustics.

PB80-130875 PC A05/MF A01
National Marine Fisheries Service, Highlands, NJ. Sandy Hook Lab.
New York Bight Ichthyoplankton Survey--Procedures and Temperature and Salinity Observations,
Myron J. Silverman, and Arthur W. Kendall, Jr.
Aug 78, 93p NMFS-NFC-TSR-18, NOAA-79111602

A summary of procedures and of temperature and salinity observations from a series of 15 ichthyoplankton cruises conducted in the New York Bight from July 1974 to June 1976 is presented. Surface and bottom temperatures and salinities from each of these cruises are included.

8K. Seismology

AD-A078 389/4 PC A02/MF A01
Scripps Institution of Oceanography La Jolla CA
A Linear Relationship between Earth Models and Seismic Body Wave Data,
LeRoy M. Dorman. 8 Dec 78, 6p
Contract N00014-75-C-0152
Pub. in Geophysical Research Letters, v6 n3 p132-134 Mar 79.

No abstract available.

8L. Snow, Ice, and Permafrost

AD-A078 692/1 PC A02/MF A01
Cold Regions Research and Engineering Lab Hanover NH
Icebergs: An Overview.
Special rept.,
Austin Kovacs. Jul 79, 11p Rept no. CRREL-SR-79-21

Icebergs are discussed and categorized according to their size, shape, composition and color. A general overview of iceberg-producing areas in the

Arctic and Antarctic is given, and their drift and deterioration are discussed. (Author)

AD-A078 709/3 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab Hanover NH
Some Bessel Function Identities Arising in Ice Mechanics Problems,
Shunsuke Takagi. Nov 79, 17p Rept no. CRREL-79-27

Some Bessel function identities found by solving problems of the deflection of a floating ice plate by two different methods are rigorously proved. The master formulas from which all the identities are derived are in a Fourier reciprocal relationship, connecting a Hankel function to an exponential function. Many new formulas can be derived from the master formulas. The analytical method presented here now opens the way to study a hitherto impossible type of problem--the deflection of floating elastic plates of various shapes and boundary conditions. (Author)

AD-A078 775/4 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab Hanover NH
Charged Dislocation in Ice. I. Existence and Charge Density Measurement by X-Ray Topography,
Kazuhiko Itagaki. Nov 79, 17p Rept no. CRREL-79-25

The motion of dislocations in single crystal ice under an electric field was observed by using X-ray topographic methods. Electric charge density on these dislocations was deduced from the amplitude and length of the dislocation segment under the known AC electrical field. The most likely linear charge density was about +5 x 10 to the minus 11th power c/m, although considerable variation is possible depending on the effective field acting on the dislocation lines. (Author)

8M. Soil Mechanics

AD-A078 495/9 PC **A02**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Structures Lab
Loading Rate Effects on Compressibility of Sand.
Final rept.,
John G. Jackson, Jr., John Q. Ehrgott, and Behzad Rohani. Nov 79, 24p Rept no. WES/MP/SL-79-24

Stress-strain curves from 61 uniaxial strain tests are presented which depict the response of three dry sands to intense transient pressures. The loadings ranged from 10 MPa to 80 MPa and were applied with rise times ranging from a few tenths of a millisecond to a few minutes. Equipment and techniques used to conduct the tests and to assess the effect of wave propagation on the measurements are described. The data show that the resistance of dry sands to compression increases dramatically when loading rise times are less than 1 msec, and that the character of the stress-strain relation shifts rapidly from a 'stiffening' response (curvature concave to stress axis) to a 'yielding' response (curvature concave to strain axis). The stress-strain response of a relatively simple rate-dependent rheologic model is shown to be in good agreement, both qualitatively and quantitatively, with the measured results. (Author)

AD-A078 726/7 PC **A07**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme CA
Seafloor Soil Sampling and Geotechnical Parameter Determination - Handbook.
Final rept. Jul 70-Sep 78,
H. J. Lee, and J. E. Clausner. Aug 79, 140p Rept no. CEL-TR-873

Geotechnical parameters are those seafloor sediment characteristics, such as shear strength or compressibility, that determine how a foundation or anchor will perform. Such characteristics are needed for design and analysis of all fixed seafloor facilities and also for assessment of seafloor penetration and breakout of other objects. This handbook shows the user, who is assumed to be an ocean engineer with little background in soil mechanics, how to obtain measurements of these properties to several different levels of accuracy. A flow diagram identifies the major decision blocks for selecting an appropriate properties determination program. The programs recommended vary from estimation and approximate measurement to coring, detailed laboratory testing, and disturbance correction, depending on the tolerable level of error. The greatest accuracy achievable is a possible error range of plus or minus 20% in shear strength. All aspects of the process of obtaining parameters are described: corers, coring procedures, coring accessories, oceanographic support vessels, core handling, laboratory testing, and test result analysis. Procedures are also given for correcting for coring disturbance in measurement of laboratory shear strengths to estimate the correct in-place strengths. (Author)

AD-A078 753/1 PC **A03**/MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Preferred Areas for Reduced Tillage - Technical Assistance Programs in the United States Drainage to Lake Erie.
Final rept.,
D. Lynn Forster. Jul 79, 27p

Previous research in the Lake Erie Wastewater Management Study (LEWMS) points to the existence of economic incentives to reduce soil erosion on many row crop acres. One of the mechanisms for reducing soil erosion and ultimately phosphorus loadings in Lake Erie is the adoption of reduced tillage technologies on selected soils series. The general purpose of this analysis is to rank geographic areas in the Lake Erie basin with respect to the apparent economic incentive for the adoption of reduced tillage technologies. At this point in time, the analysis investigates only 'apparent' economic incentives. Reduced tillage technologies are used on a widespread basis; thus, analysis of the results of using these technologies are projections based on research results rather than actual farm experience. (Author)

AD-A078 772/1 PC **A03**/MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Levels of Plant Available Phosphorus in Agricultural Soils in the Lake Erie Drainage Basin.
Final technical rept.,
Terry J. Logan. Dec 77, 42p

Phosphorus has been identified as the nutrient element most limiting to the growth of algae in Lake Erie. In addition, nutrient loadings by tributaries are a major source of phosphorus to the lake; of this load, the diffuse load, and especially the agricultural diffuse load is a major component of the total P input to Lake Erie. The particulate P load carried by a stream has several sources: native soil P, P from fertilizer, manure, and waste, P from crop residues and detritus. The bulk of sediment-P, however, is native soil P except where additions of manure have been heavy over many years. In light of these issues, a study was initiated to investigate levels of available-P in agricultural soils in the Lake Erie drainage basin. This report is concerned with two major objectives: (1) To survey actual field levels of available P in a county in Ohio and compare these with published soil test summary data for the same area; and (2) to determine if similar data were available in other Lake Erie Basin states and to determine if soil test methods and recommendations varied significantly from state to state. (Author)

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A078 538/6 PC **A03**/MF **A01**
Hughes Research Labs Malibu CA
Optical-Microwave Interactions in Semiconductor Devices.
Quarterly rept. no. 5, 1 Jul-30 Sep 79,
L. Figueroa, C. Slayman, and H. W. Yen. Oct 79, 29p
Contract N00173-78-C-0192

GaAs FETs and Gunn diodes with built-in optical waveguides are being developed. The purpose is to allow optical signals to be coupled into the active region of the devices efficiently. These FETs will be useful for optical mixing, optical injection locking, and optical detection purposes. The Gunn diodes will be used for high-speed pulsed modulation of injection lasers. (Author)

AD-A078 631/9 PC **A05**/MF **A01**
Hughes Aircraft Co Torrance CA Electron Dynamics Div
Bonded Grid Development.
Final technical rept. 1 Feb 78-31 Jan 79,
Richard Dawson. Oct 79, 84p RADC-TR-79-249
Contract F30602-78-C-0101

This report details the results of efforts expended towards the development of a cathode and control grid assembly having the control grid solidly bonded to the cathode surface by means of a layer of insulating material. A device capable of emission and modulation was fabricated and tested. This effort demonstrated the feasibility of a control grid for microwave tubes fabricated with lithographic techniques directly on the cathode surface. When perfected this technique has two primary payoffs: (1) It will permit the use of high gain control grids at higher frequencies than possible with present shadow grid construction techniques, (2) It will also improve tube reliability, yield and construction cost. This technique will be applicable to microwave tubes used in tactical and ground based radars as well as ground based and satellite communications systems.

AD-A078 718/4 PC **A05**/MF **A01**
Georgia Inst of Tech Atlanta Systems and Techniques Lab
Electromagnetic Shielding of Structural Foams by Using Internal Conductive Materials.
Final rept. 14 Feb 77-31 Dec 78,
D. G. Bodnar, and B. M. Jenkins. Aug 79, 76p
AMMRC-TR-79-49
Contract DAAG46-77-C-0027
See also AD-A050 817.

This report summarizes the analysis performed during the program to assess the RF shielding effectiveness obtainable by using internal conductive materials in structural foams. The major emphasis was on the use of carbon/graphite fibers as the conductive material although consideration was given to metalized glass fibers and to metal particles. Several mathematical analysis techniques were considered for assessing shielding effectiveness including the method of moments, wire grid analysis, meteorological, and plane wave analysis. The plane wave analysis technique was deemed the most applicable. Calculations of shielding effectiveness are presented in the HF through UHF frequency range for various material characteristics. Test panels were fabricated and tested from 10-1,000 MHz. Carbon, graphite fibers and aluminum coated glass fibers were used as the filler material in the foam panels. Measured data are presented for different concentrations as well as for different types of filler material. Two of the materials tested provided adequate shielding for civilian radio frequency equipment application in the UHF (300-3,000 MHz) region. (Author)

AD-A078 733/3 PC **A06**/MF **A01**
Royal Aircraft Establishment Farnborough (England)
Influence of the Environmental Conditions on a Quartz Resonator (Influence Des Conditions D'environnement sur un Resonateur a Quartz),
Michel Valdois. May 78, 115p RAE-LIBRARY TRANS-1897, DRIC-BR-70941
Trans. of ONERA Technical Note 225 (1974).

No abstract available.

AD-A078 832/3 PC **A02**/MF **A01**
Aerospace Corp El Segundo CA Ivan A Getting Labs
Long-Term Thermal Stability of Solithane, a Candidate TWT Encapsulant.
Final rept. 1 Feb-30 Sep 78,
Camille A. Gaulin, Vester L. Knight, and Manfred Buechler. 30 Sep 79, 17p TR-0079(4402)-1, SAMSO-79-038
Contract F04701-78-C-0079

In support of traveling-wave tube amplifier tube encapsulant evaluations, a cured sample of Solithane 113 (a polyurethane potting compound sup-

plied by Watkins-Johnson) was exposed to a vacuum-thermal (120 C) environment for 300+ hours to determine if channel degradation occurs on such exposure. Degradation was determined qualitatively by sampling into a quadrupole mass spectrometer the gases and vapors produced from the sample and analyzing the spectra of the gases. The resultant spectra indicated significant thermochemical degradation of the polymer under the conditions of the exposure. These results should be factored into deliberations on the choice of encapsulants for TWTA components. Degradation of this kind may markedly affect physical-chemical properties of the material over the long term and should be treated as a potential source of tube failure due to corona discharge. (Author)

AD-A078 840/6 PC **A03**/MF **A01**
Hull Corp Hatboro PA Thinco Div
Program to Design, Develop, Fabricate and Deliver Thin Film Chip Inductors Suitable for Hybrid Circuit Applications.
Final rept.,
Stephen T. C. Chen. 13 Nov 79, 32p NADC-78111-40
Contract N62269-78-C-0312

Inductors were fabricated using thin film techniques. The winding of an inductor was formed by depositing alternate layers of metal and dielectric material in steps of one-half turns. The optimization of Q-factor and self-resonant frequency were discussed. Comparison of circular and square geometry were made indicating that the circular one was preferred. Use of magnetic ferrite substrate to increase the inductance and the Q-factor has been achieved. Different methods for the measurements of inductance and Q-factor were described and the results of the measurement of a thin film inductor were given. (Author)

AD-A078 864/6 PC **A04**/MF **A01**
Eg and G Inc Salem MA Electronic Components Div
Plasma Cathode Thyratron.
Final rept. 1 Sep 77-23 Feb 79,
David Fleischer, and David Turnquist. Sep 79, 64p DELET-TR-77-2704-F
Contract DAAB07-77-C-2704

An instant-starting hydrogen thyratron is described which incorporates a cathode requiring no warmup time, no standby power, and no separate heater power supply. Starting cold, time jitter is less than 1 ns; anode delay time is less than 200 ns; and the 0-30 second anode delay time drift is less than 100 ns. The cathode is a self-heating design made of impregnated tungsten. Even when cold, it provides sufficient emission capability to trigger readily and to prevent arcing. During operation, it attains full operating temperature via plasma heating effects and its own resistive dissipation; after shutdown, it remains active, in readiness for the next cold start, a cycle which can be repeated as often as desired. Thyratrons made with the new cathode display operating behavior and life comparable to conventional hydrogen thyratrons of equivalent size. (Author)

AD-A078 865/3 PC **A10**/MF **A01**
Magnetic Corp of America Waltham MA
Magnetohydrodynamic (MHD) Magnet Modeling.
Interim technical rept. Mar-Sep 78,
Z. J. J. Stekly, Robert D. Pillsbury, Jr., Alan R. Beckwith, and R. Doug Holmes. Jun 79, 225p MCA-WP13-01, AFAPL-TR-79-2045
Contract F33615-77-C-3117
Prepared in cooperation with General Dynamics Corp., San Diego, CA. Convair Div.

This report presents the results of a study to establish scaling criteria for a lightweight, superconducting magnet system for use in magnetohydrodynamic power generation. The scaling criteria are used to determine the appropriate size for a model magnet to be built to demonstrate the major system parameters of a full scale, 30 MWe, magnet system. (Author)

N80-14255/7 PC **A02**/MF **A01**
Toulouse Univ. (France). Lab. de Genie Electriques.
The Use of Chelates to Neutralize Defects Giving Rise to Partial Discharges in Insulating Materials Other Than Polyethylene: The Particular Case of Epoxy Resins Utilisation des Chelates Comme Agents Cicatrisants des Defauts Qui Sont le Siege des Decharges Partielles dans les Isolants Autres Que le Polyethylene. Cas Particulier des Resines Epoxydes.
Progress Report.
Dec 78, 22p PUBL-379
Language in French.

The effect of metallic chelates in increasing the insulating films partial discharge initiation voltage, as was already demonstrated for polyethylene, was explored for the case of epoxy resins. The results show that the direct current resistivity increases slightly, that a space charge is formed when the electric field is larger than 4 kV/mm, and that the electric rigidity under continuous tension increases strongly, but much less in the case of 50 Hz alternating current. Possible mechanisms of the chelate effect are discussed.

PAT-APPL-6-065 670 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Method and Apparatus for the Analysis of Semi-Conductors.
Patent Application,
Wilbur A. Garber . Filed 10 Aug 79, 14p AD-D006 755/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Described is a method for obtaining, for analyzation, the current induced in the insulating regions of a MOS semiconductor device, when irradiated by high energy electrons in a scanning electronic microscope; the steps include blanking the electron beam, allowing current in the substrate to dissapate, after a selected delay detecting the desired induced current and analyzing it for any number of desired purposes. (Author)

PAT-APPL-6-070 383 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Parallel Multi-Electrode Spark Gap Switch.
Patent Application,
James P. O'Loughlin. Filed 28 Aug 79, 10p AD-D006 761/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A spark gap switching device for high peak currents includes a pair of main electrodes with protruding, opposing sub-electrodes, surrounded by high permeability cores typically of ferrite material. Small air gaps separate the sub-electrodes. The switch is activated by an over voltage or the like causing one of the sub-electrodes to breakover producing a flux time rate of change in the core. A voltage is induced in the non conducting sub-electrodes causing aligned pairs to rapidly increase in potential difference until one by one they all conduct. (Author)

PAT-APPL-6-072 727 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Method of Making V-MOS Field Effect Transistors.
Patent Application,
M. D. Jhabvala. Filed 5 Sep 79, 12p N80-12281/5, NASA-CASE-GSC-12515-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method of making V-MOS field effect transistors is disclosed. A masking layer is first formed over a surface of a crystalline substrate. An aperture is formed in the masking layer to expose the surface of the substrate. An anisotropic etchant is applied to the exposed surface so that a groove having a decreasing width with increasing depth is formed. The etch is not allowed to go to completion, with the result that a partially formed V-shaped groove is formed. Ions are accelerated through the aperture for implantation in the crystalline substrate in the lower portion of the partially formed V-shaped groove. An anisotropic etchant is reapplied to the partially formed V-shaped groove, and the etch is allowed to go to completion.

PATENT-4 172 630 Not available NTIS
Department of the Navy Washington DC
Multimode Electrooptic Waveguide Switch.
Patent,
William K. Burns, and Thomas G. Giallorenzi. Filed 13 Apr 78, patented 30 Oct 79, 6p AD-D006 780/1, PAT-APPL-896 062
Supersedes PAT-APPL-896 062-78, AD-D004 973.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An electrooptic switch in which one of four channel waveguides is selectively induced in a thin slab of electrooptic material by the application of an electric field between intersecting strips of electrodes disposed adjacent the top surface of the slab and other intersecting strips of electrodes disposed adjacent the bottom surface directly below the top surface strips. The electrode strips comprise (1) primary electrodes to which constant potentials are applied to induce optical paths partially through the slab and (2) switching electrodes, vertically displaced and electrically isolated from the primary electrodes, to which alternating potentials are applied to complete the desired optical path through the slab. (Author)

PATENT-4 173 384 Not available NTIS
Department of the Navy Washington DC
Flexible Co-Axial Connector for Cable In-Line Electronics.
Patent,
Raymond J. Phillips. Filed 23 Aug 78, patented 6 Nov 79, 4p AD-D006 778/5, PAT-APPL-936 541
Supersedes PAT-APPL-936 541-78, AD-D005 428.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent covers a co-axial radio frequency flexible connector system for use in traversing through and/or over sheaves, hull fittings, cable handling equipment and machinery, and reeling operations. The system comprises a bellows enclosing a spring assembly. The bellows provides a fixed length electrical path which remains the same during flexing, tension and compression. The system is radially rigid to inhibit rotation of components. Electrical contact engagement is enhanced by having the components under a pre-determined amount of compression when assembled and in use. (Author)

PATENT-4 174 471 Not available NTIS
Department of the Navy Washington DC
Explosively Actuated Opening Switch.
Patent,
Richard D. Ford, and Ihor M. Vitkovitsky. Filed 27 Mar 78, patented 13 Nov 79, 5p AD-D006 777/7, PAT-APPL-890 873
Supersedes PAT-APPL-890 873-78, AD-D005 060.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent concerns a modular opening switch for high currents providing high current-carrying capacity, high voltage hold-off capability and very short opening time. The switch operates on the principle of an explosively generated pressure which ruptures and then drives paraffin radially through a cylindrical current conducting tube, so that the paraffin provides a electrically insulative barrier between the ruptured portions of the conducting tube. Alternate cutting and bending rings, between which insulating rings are placed, are disposed around the periphery of the conductor tube. The insulating rings are tapered at the periphery of the conductor tube to provide void spaces into which the paraffin is driven and firmly packed without voids or cracks which deteriorate the insulating property of the paraffin.

9B. Computers

AD-A078 322/5 PC **A02**/MF **A01**
California Univ Los Angeles Graduate School of Management

On the Use of Simulation in the Design and Implementation of Distributed Systems.
Technical rept.,
Bennet P. Lientz. Dec 79, 21p
Contract N00014-75-C-0266

The need for planning and design of distributed systems has been stressed repeatedly. However, insufficient attention has been directed at the organized employment of mathematical and statistical tools which are computer based. Developed here is a general methodology for planning distributed systems using simulation as the major ingredient. Applications of the methodology are discussed. (Author)

AD-A078 364/7 PC **A10/MF A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
The GIFT Code User Manual. Volume II. The Output Options.
Final rept.,
Gary G. Kuehl, Lawrence W. Bain, Jr., and Mathew J. Reisinger. Sep 79, 202p ARBRL-TR-02189, AD-E430 343
See also Volume 1, AD-B006 037L

The Geometric information for Targets (GIFT) code is a FORTRAN language code used to mathematically describe the geometry of a three-dimensional vehicle such as a tank, truck or helicopter. The geometric data generated by the GIFT code is merged in vulnerability computer codes with the energy effects data of a selected munition to simulate the probabilities of malfunction or destruction of components when it is attacked by the selected munition. To simulate the geometry of a vehicle, the GIFT code uses combinatorial geometry (COM-GEOM) data. The COM-GEOM data consists of three tables: a Solid Table, a Region Table, and a Region Identification Table. The GIFT code contains numerous tests and checks to ensure that COM-GEOM data listed in these three tables is correct. The GIFT code options include those which graphically display the vehicle, those which check the correctness of the geometry data, those which compute physical characteristics of the vehicle, and those which generate the geometric data used by vulnerability codes. The user manual describes the tests made on the COM-GEOM data, the output options and the output generated by the GIFT code.

AD-A078 369/6 PC **A03/MF A01**
Maryland Univ College Park Computer Science Center
Decision Rules for Choice of Neighbors in Random Field Models of Images.
Technical rept.,
R. Chellappe, R. L. Kashyap, and N. Ahuja. Aug 79, 37p TR-802, AFOSR-TR-79-1271
Grant AFOSR-77-3271
Prepared in cooperation with Purdue Univ., Lafayette, IN. School of Electrical Engineering.

Consider the parametric representations of a homogeneous (not necessarily isotropic) random field by a set of neighborhood models. Using Bayesian methods and spectral representation of random fields, this paper develops decision rules for choosing a model from a set of r such random field models which differ in their neighborhoods. The theory developed here will find applications in image modeling and texture characterization. (Author)

AD-A078 390/2 PC **A16/MF A01**
International Computing Co Bethesda MD
Vessel Traffic Services Processing/Display Subsystem Software Requirements and Design.
Final rept. Dec 78-Sep 79,
Carle C. Henson, R. Scott Graham, and Bonnie A. McIntosh. Sep 79, 375p USCG-D-72-79, CGR/DC-24/79
Contract DOT-CG-81-78-1833
See also Rept. no. USCG-D-66-79 dated Jul 79, AD-A076 501, AD-A061 307 and AD-A075 053.

This report defines the detailed operational requirements for the Vessel Traffic System(VTS) Processing/Display Subsystem and provides the current state of the software design. Both parts(i.e., requirements and design) of this report begin with an overview and an introduction to the methodology used. The balance of both parts is a detailed, technically oriented, function by function description of the specification and the design. Specifications are included for operator invoked functions which are used to enter and retrieve information, and to request subsystem services, as well as specifications for automatic processes which update vessel location, course and speed, and detect and report on potentially hazardous conditions. At the highest level of the design, the software for the VTS Processing/Display Subsystem has been decomposed into processes which operate concurrently and cooperate to perform the required functions. These processes will communicate and synchronize their activities by the exchange of explicit messages and answers. This approach provides flexibility in assigning processes to processors, which is a critical factor in providing a system that can manage a broad range of functional and load handling requirements.

AD-A078 417/3 PC **A03/MF A01**
Massachusetts Inst of Tech Cambridge Artificial Intelligence Lab
AMORD: A Deductive Procedure System.
Memorandum rept.,
Johan de Kleer, Jon Doyle, Charles Rich, Guy L. Steele, Jr., and Gerald Jay Sussman. Jan 78, 49p Rept no. AI-M-435
Contract N00014-75-C-0643, Grant NSF-MCS77-04828

AMORD is a system for writing problem solvers. It encourages a style of expression in which the logical relationships of the knowledge and control structure of the problem solver are made explicit. A minimal set of mechanisms is supplied by AMORD so that most of the knowledge that must be formalized and the decisions that must be made in constructing a problem solving program must, to a large degree, be made explicit in AMORD. This makes AMORD a vehicle for expressing the structure of problem solvers. Once the problem solving structure has been formalized, the task of transferral to programs in programming languages is straightforward. The important aspect of AMORD is the discipline of explicit control it enforces, rather than the specific language or syntax in which the control knowledge is expressed. The basic mechanism of AMORD is the pattern-directed invocation of a set of rules operating on an indexed data base of assertions. We have implemented an interpreter for the rule-based system, AMORD, based on a non-chronological control structure and a system of automatically maintained data-dependencies. The purpose of this paper is to serve as a reference manual and as an implementation tutorial. It illustrates: (1) The discipline of explicit control and dependencies; (2) How to use AMORD; and (3) One way to implement the mechanisms provided by AMORD.

AD-A078 419/9 PC **A03/MF A01**
Massachusetts Inst of Tech Cambridge Artificial Intelligence Lab
A Truth Maintenance System,
Jon Doyle. Jun 79, 47p Rept no. AI-M-521
Contract N00014-75-C-0643, Grant NSF-MCS77-04828

To choose their actions, reasoning programs must be able to make assumptions and subsequently revise their beliefs when discoveries contradict these assumtions. The Truth Maintenance System (TMS) is a problem solver subsystem for performing these functions by recording and maintaining the reasons for program beliefs. Such recorded reasons are useful in constructing explanations for program actions and in guiding the course of action of a problem solver. This paper describes (1) the representations and structure of the TMS, (2) the mechanisms used to revise the current set of beliefs, (3) how dependency-directed backtracking changes the current set of assumptions, (4) techniques for summarizing explanations of beliefs, (5) how to organize problem solvers into 'dialectically arguing' modules, (6) how to revise models of the belief systems of others, and (7) methods for embedding control structures in patterns of assumptions. We stress the need of problem solvers to choose between alternate systems of beliefs, and outline a mechanism by which a problem solver can employ rules guiding choices of what to believe, what to want, and what to do. (Author)

AD-A078 428/0 PC **A04/MF A01**
Boston Univ MA Dept of Systems and Computer Engineering
Towards Aspect Invariant Feature Sets for Characterizing Three Dimensional Objects.
Final rept.,
Alan A. Desrochers. 1979, 53p AFOSR-TR-79-1253
Grant AFOSR-79-0039

The problem of characterizing three dimensinal objects with a minimum number of feature sets is addressed. Previous research has been plagued by features which are a function of aspect angle and so efforts have concentrated on characterizing an object with several hundred prototype feature sets. In this work it is demonstrated that in many cases, the silhouette obtained from one view of the object can be derived from a linear transformation of the silhouette from another view. As a result of this relationship, a single set of moments which is invariant to such a general linear transformation can be used to characterize many views of the same object and hence the number of prototype feature sets required to specify an object is reduced. In addition, it is demonstrated that for some objects it is advantageous to partition the object into regions in order to find the region of the object which is least dependent upon aspect angle. (Author)

AD-A078 438/9 PC **A03/MF A01**
Gaertner (W W) Research Inc Stamford CT
Programming Support Library. Volume I. Functional Requirements.
Final technical rept.,
Carolyn M. Turcio, William M. Schreyer, Norman A. Adams, and Wolfgang W. Gaertner. Oct 79, 41p RADC-TR-79-241-VOL-1
Contract F30602-78-C-0103

This report, Vol 1 contains the generic functional requirements for a programming support library. The requirements are presented at two levels of detail. Chapter 2 contains a brief summary of the requirements separated into Basic and Full PSL requirements. Chapter 3 contains the full wording of the requirements organized into nine categories. The specification for each individual requirement is followed by a brief description of its purpose. This volume may be used as the specification for a Full or Basic PSL under a software development contract. Volume II will be published at a later date. (Author)

AD-A078 460/3 PC **A03/MF A01**
California Univ Los Angeles Graduate School of Management
Guidelines for Evaluation of Minicomputer Hardware and Software - A User Perspective.
Technical rept.,
Bennet P. Lientz. Dec 79, 49p
Contract N00014-75-C-0266

Guidelines are presented for the evaluation and selection of hardware and system software for minicomputers. The evaluation is presented from a non-technical user point of view as opposed to a detailed technical comparison. The issues covered include defining an approach for computing, acquiring a minicomputer system, negotiation with vendors, installation and operation. Case examples are given along with examples of failure. (Author)

AD-A078 463/7 PC **A02/MF A01**
Carnegie-Mellon Univ Pittsburgh PA Dept of Electrical Engineering
Automated Synthesis of Digital Hardware Modules; Simulation and Verification of Interconnections.
Final rept. 1 Jun 78-31 Aug 79,
Alice C. Parker, and Donald E. Thomas. 31 Oct 79, 17p ARO-13670.16-EL
Grant DAAG29-73-G-0070

The research described in this final report involves two basic areas: automated design and optimization of digital hardware, and simulation and verification of interconnections between digital system modules. Both of these are part of the CMU-DA (Design Automation) project (formerly called the RT-CAD project). We have investigated strategies for computer-aided optimization of the control part of digital systems hardware by developing a dis-

crete optimization technique and a strategy for applying this technique. In addition, we have developed a design aid for computer interconnection evaluation by simulation techniques. Finally, we have begun to design a system to formally verify that a description of interconnections is functionally correct. (Author)

AD-A078 468/6 PC **A03**/MF **A01**
Maryland Univ College Park Computer Vision Lab
Image Models.
Interim rept.,
Narendra Ahuja, and Azriel Rosenfeld. Jul 79, 38p TR-781, AFOSR-TR-79-1158
Grant AFOSR-77-3271

This paper reviews pixel-based and region-based ('structural') image models. The former include both one-dimensional time series and random field models, with the properties of the field specified either locally or globally. (Author)

AD-A078 520/4 PC **A10**/MF **A01**
Oregon Graduate Center Beaverton Dept of Applied Physics and Electronic Science
Field Electron and Ion Source Research for High Density Information Storage System.
Final technical rept. Sep 77-Dec 78,
L. W. Swanson, J. Orloff, and A. E. Bell. May 79, 202p AFAL-TR-79-1133
Contract F33615-76-C-1327

The purpose of this research program is the evaluation and characterization of high brightness field electron and ion sources suitable for use in high density information storage systems. In addition, preliminary evaluation of focussing optics suitable for forming submicron beams of both ions and electrons has been performed. Several new field electron source materials including Mo, LaB6, SmB6 and HfC have been examined. In addition, a complete characterization and comparison between the Zr/W(100) and built-up W(100) emitters operating in the thermal-field (TF) mode is reported. Such source parameters as angular intensity, energy distribution, beam noise spectrum, and source life have been measured.

AD-A078 525/3 PC **A03**/MF **A01**
Maryland Univ College Park
The Formal Specification of an Adaptive, Parallel Finite Element System.
Technical rept.,
Pamela Zave. Dec 78, 41p Rept no. TR-715
Contract N00014-77-C-0623

The FEARS system is an experimental finite element system which uses adaptivity and parallelism to alleviate computational problems of the method. This report contains a formal specification of the system which is complete down to, but not including, the numerical processing. It functions as a realistically complex example of the specification technique used. (Author)

AD-A078 535/2 PC **A02**/MF **A01**
Wisconsin Univ-Madison Dept of Industrial Engineering
Validation of Simulation Models, I. An Overview and Survey of Real-World Practice.
Technical rept.,
Averill M. Law. Aug 79, 25p Rept no. TR-78-14
Contracts N00014-76-C-0403, DAAG29-75-C-0024

The problem of assessing the degree to which a model constructed for use in a simulation study faithfully represents the corresponding real system is considered. The focus here is to survey general approaches and methods which have been used in practice, or could be implemented, including good programming techniques, verifying that the program itself is correct, overall goals of the validation of a model, and a general framework for the total validation effort. Several concrete examples are discussed to illustrate the methods as well as possible pitfalls. (Author)

AD-A078 582/4 PC **A03**/MF **A01**
Navy Personnel Research and Development Center San Diego CA
Data Entry Times for Navy Tactical Information Displays.
Final rept.,
Larry A. Friedman. Nov 79, 40p Rept no. NPRDC-TR-80-6

The Menu and Page methods of data entry and display format are candidates for possible use on a cathode ray tube (CRT) display on the Navy Tactical Data System. The Menu method presents all possible category choices at a given level of data hierarchy; the operator enters the number that corresponds to his choice of categories from the displayed 'menu' of choices. The Page method displays only a subset of possible choices at each level of the hierarchy. If the desired category does not appear, the operator sequences to the next 'page' of categories, until he finds the required category. Reaction time measures were used to assess the relative speed of data entry using six different types of problems in each of the two methods. Results showed that although each method took longer for problem types requiring deeper hierarchial structure, there was no difference in the methods themselves. There was a significant practice effect, which was also independent of method. Neither method was preferred by the operators. It is recommended that the 'page' method be pursued since it makes more efficient use of CRT screen area. Further, the method can be improved by organizing the categories so that more frequently occurring itmes appear on earlier 'pages'. (Author)

AD-A078 594/9 PC **A13**/MF **A01**
Honeywell Inc St Petersburg FL
Military Adaptation of Commercial Item (MACI) Program on Electrically Alterable Read Only Memory (EAROM).
Interim rept. no. 1, 15 Jul 78-15 Jan 79,
Richard L. Wiker. Oct 79, 278p 1079-16060, DELET-TR-78-2935-1
Contract DAAB07-78-C-2935

A military applications survey for EAROM devices was conducted. Three potential vendors of suitable EAROM devices were identified at GI, NCR and Nitron. Devices were procured and testing started. Measurement techniques were developed to characterize unique MNOS parameters. (Author)

AD-A078 632/7 PC **A07**/MF **A01**
Boeing Computer Services Inc Seattle WA Systems Engineering Technology Federal Systems Group
Management Tools Case Study.
Final technical rept. Dec 77-Dec 78,
John R. Brown, and Linda S. Hammond. Sep 79, 136p RADC-TR-79-223
Contract F30602-78-C-0044

This study investigated documentation and procedures for the NASA Integrated Programs for Aerospace Vehicle Design (IPAD) Program. The purpose was to assess IPAD's value to a proposed R&D program for evaluating the application of management principles and disciplines to the management of software development. To determine the actual relationship between IPAD objectives and the application of management techniques, a survey was given to key IPAD management and technical personnel. A summary of the responses is presented in Appendix C. The report discusses: key responsibilities; formal and informal direction; status, progress, and performance indicators. A generalized management tool model is presented to summarize the studied relationships between status indicators, program objectives, management techniques (MT), MT indicators, and key responsibilities. Hypothetical IPAD Situation Scenarios were generated to illustrate the steps taken in the IPAD environment to implement the management practices and tools studied. The report contains sample reports and forms as well as checklists. (Author)

AD-A078 690/5 PC **A13**/MF **A01**
Purdue Univ Lafayette IN School of Electrical Engineering
Design and Analysis of Interconnection Networks for Partitionable Parallel Processing Systems.
Interim rept.,
S. Diane Smith, and Howard Jay Siegel. Aug 79, 297p TR-EE79-39, AFOSR-TR-79-1272
Grant AFOSR-78-3581
Errata sheet inserted.

A single instruction stream - multiple data stream (SIMD) computer performs one algorithm (single instruction stream) on vectors of data of a control unit (CU), processing elements (PEs), and an interconnection network. The CU broadcasts instructions to the N Pes (where N is a power of two). The interconnection network is the mechanism that allows PEs to pass data among themselves. Four types of interconnection networks are discussed in this work: the Shuffle-Exchange network, the Cube network, the ILLIAC network, and the Plus-Minus 2 (PM2I) network. Each type has been discussed in the literature and used in an existing or proposed machine design. For each of these four network types, different hardware structures are considered. A recirculating network consists of one stage of switches that is reused until the data reach their final destinations. A combinational logic multistage network consists of several stages of switches and, usually, data is transferred in one pass through the network. In pipelined multistage networks, which are introduced, registers are inserted after each stage of a combinational logic multistage network. The data are divided into segments, and these segments are passed in a parallel-pipelined manner. Hardware implementations for recirculating, combinational logic multistage, and pipelined multistage networks are presented and analyzed.

AD-A078 702/8 PC **A04**/MF **A01**
Air Force Avionics Lab Wright-Patterson AFB OH
Magnetic Bubble Research.
Final technical rept. 15 Aug 75-30 Sep 78,
Millard G. Mier. Nov 79, 55p Rept no. AFAL-TR-79-1128

Geometrical analysis techniques are used to derive computer memory system characteristics to support a hypothetical but realistic Air Force tactical mission scenario. Commercially available computer memory systems which might fulfill this requirement are reviewed and found unsuitable. Four emerging technologies which appear to have potential for fulfilling this requirement in the mid-1980's are reviewed and projected characteristics of a suitable capacity system based on each technology derived. The most promising technology, magnetic bubble memory, is examined and a major barrier to development is found to be the accurate characterization of materials supporting micron-sized magnetic bubbles.Standard techniques are examined for characterization of materials supporting very small magnetic bubbles. The failing of all techniques is optical microscopic resolution of these bubbles. Three new techniques for this characterization, based on magnetic susceptibility changes with applied magnetic field, are examined and found to be suitable for small magnetic bubbles. A fast running Control Data Corporation (CDC) FORTRAN EXTENDED computer analysis program is described for analyzing experimental data and calculating all the static bubble materials parameters. (Author)

AD-A078 706/9 PC **A03**/MF **A01**
University of Southern California Los Angeles Dept of Computer Science
Joyce. A Language for Computer Networks.
Technical rept.,
Per Brinch Hansen. Nov 79, 43p
Contract N00014-77-C-0714

This report defines an experimental programming language called Joyce which is intended for real-time applications controlled by microcomputer networks without common storage. The language includes distributed processes which communicate and synchronize themselves by means of procedure calls and guarded regions. The present version of the language is implemented on a PDP 11 single-processor system. The compiler is not available for distribution. (Author)

AD-A078 720/0 PC **A02**/MF **A01**
Environmental Research Inst of Michigan Ann Arbor
Synthetic Aperture Imaging Techniques at Short Wavelengths.
Final rept. 1 Apr 76-30 Sep 79,
Carl C. Aleksoff. Nov 79, 6p ERIM-122000-14-F, ARO-13735.4-ELX
Grant DAAG29-76-G-0184

A number of bistatic synthetic aperture (SA) imaging techniques applicable to short wavelength radi-

ation have been analyzed, and near real time two-dimensional SA imaging using visible light has been demonstrated. (Author)

AD-A078 781/2 PC **A12/MF A01**
California Univ Davis Signal and Image Processing Lab
Applications of Stochastic Models for Image Data Compression.
Technical rept.,
Shenq-Huey Wang, and Anil K. Jain. Sep 79, 256p ARO-16222.3-EL
Grant DAAG29-78-G-0206

Intraframe image data compression systems are analyzed in this thesis using stochastic modeling concepts. The formulations of stochastic image models are obtained from different classes of partial differential equations. Their application to the coding problem shows the connection between predictive, hybrid and transform coding schemes. The resulting coding schemes are evaluated in terms of tangible system terms such as signal to noise ratio, mean square error and rate distortion curve. (Author)

AD-A078 841/4 PC **A09/MF A01**
California Univ Davis Signal and Image Processing Lab
Interframe Adaptive Data Compression Techniques for Images.
Technical rept.,
Jaswant R. Jain, and Anil K. Jain. Aug 79, 194p
ARO-16222.2-EL
Grant DAAG29-78-G-0206

A method of interframe motion measurement and compensation, based on approximation of piecewise linear translation of small rectangular areas, is presented. This method significantly improves the temporal correlation and permits reduction of sampling rate along temporal axis. A technique of visual characterization of interframe characteristics, based on temporal cross-sections, is described. Some commonly used statistical models for prediction of the variances of transform coefficients, in intraframe and interframe transform coding, are compared. Results show that measured statistics in transform domain result in 2 to 4 dB improvement over commonly used separable covariance models. Interframe transform and hybrid coding schemes are compared against intraframe transform coding and some simple interframe predictive coding schemes. Also, distortion-rate curves for hybrid coding, based on models of interframe motion have been plotted. The applications of transform and hybrid coding to biomedical x-ray images has been considered. A method for joint optimization of source coding and channel coding for PCM transmission over noisy channels is presented. The performance of several transforms has been compared for some commonly used intraframe nonseparable covariance models. (Author)

AD-A078 863/8 PC **A09/MF A01**
Massachusetts Inst of Tech Cambridge Project Mac
Perceptrons and Pattern Recognition,
Marvin L. Minsky, and Seymour Papert. Sep 67, 193p Rept nos. MAC-M-358, AI-M-140
Contract Nonr-4102(01)

This monograph includes most of the results to date of our analysis of the geometric ability of linear separation machines. We expect soon to publish the complete work as a book: the complete version will contain further results on learning and on some relation between parallel and serial algorithms. Topics include: Algebraic Theory--Theory of Boolean linear separation functions, Group theory of linear predicates, Some special predicates, and The 'And-Or' Theorem; Geometric Theory--Connectivity and topological properties, Geometric patterns of low order, Normalization and stratification, and The Diameter-limited perceptron; and Magnitude of the Coefficients.

AD-A078 926/3 PC **A05/MF A01**
National Communications System Washington DC
Introduction to the CCITT High Level Language.
Technical information bulletin,
Robert M. Fenichel. Jan 80, 97p NCS-TIB-80-1, AD-E100 320

This Technical Information Bulletin (TIB) reprints the third edition of 'Introduction to CHILL', published by Working Party 3 of the International Telegraph and Telephone Consultative Committee's (CCITT) Study Group XI. CHILL is the name given the CCITT High Level Language. The CHILL high level language standard is being developed for programming stored program controlled telephone exchanges, but is considered general enough for other telecommunications programming applications as well. (Author)

AD-A078 937/0 PC **A19/MF A01**
International Computing Co Bethesda MD
Vessel Traffic Services Processing/Display Subsystem Software Requirements and Design. Part 2. Software Design.
Final rept. Dec 78-Sep 79,
Carle C. Henson, R. Scott Graham, and Bonnie A. McIntosh. Sep 79, 426p USCG-D-73-79
Contract DOT-CG-81-78-1833
See also report dated Jul 79, AD-A076 501.

This report defines the detailed operational requirements for the Vessel Traffic System (VTS) Processing/Display Subsystem and provides the current state of the software design. Both parts (i.e., requirements and design) of this report begin with an overview and an introduction to the methodology used. The balance of both parts is a detailed, technically oriented, function by function description of the specification on the one hand and the design on the other. Specifications are included for operator invoked functions which are used to enter and retrieve information, and to request subsystem services; as well as specifications for automatic processes which update vessel location, course and speed, and detect and report on potentially hazardous conditions. At the highest level of the design, the software for the VTS Processing/Display Subsystem has been decomposed into processes which operate concurrently and cooperate to perform the required functions. These processes will communicate and synchronize their activities by the exchange of explicit messages and answers. This approach provides flexibility in assigning processes to processors, which is a critical factor in providing a system that can manage a broad range of functional and load handling requirements. (Author)

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National Bureau of Standards, Washington, DC.
Federal Information Processing Standards Register.
1979, 2540p-in 67v
Supersedes FIPS SET 78. Set includes FIPS PUB 0 thru FIPS PUB 67, and 3 ring vinyl binder.

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N80-14175/7 PC **A99/MF A01**
IBM Federal Systems Div., Houston, TX.
Software Design Specification. Part 2: Orbital Flight Test (OFT) Detailed Design Specification. Volume 3: Applications. Book 2: System Management.
16 Oct 79, 977p NASA-CR-160389
Contract NAS9-14444

The functions performed by the systems management (SM) application software are described along with the design employed to accomplish these functions. The operational sequences (OPS) control segments and the cyclic processes they control are defined. The SM specialist function control (SPEC) segments and the display controlled 'on-demand' processes that are invoked by either an OPS or SPEC control segment as a direct result of an item entry to a display are included. Each processing element in the SM application is described including an input/output table and a structured control flow diagram. The flow through the module and other information pertinent to that process and its interfaces to other processes are included.

N80-14180/7 PC **A19/MF A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Flight Design System-1 System Design Document. Volume 9: Executive Logic Flow, Program Design Language.
Dec 79, 449p NASA-TM-80841, JSC-12564

The detailed logic flow for the Flight Design System Executive is presented. The system is designed to provide the hardware/software capability required for operational support of shuttle flight planning.

N80-14772/1 PC **A05/MFA01E**
Lockheed Electronics Co., Houston, TX. Systems and Services Div.
Clustering Algorithm Evaluation and the Development of a Replacement for Procedure 1.
R. K. Lennington, and J. K. Johnson. Nov 79, 80p NASA-CR-160424, LEC-13945
Contract NAS9-15800

An efficient procedure which clusters data using a completely unsupervised clustering algorithm and then uses labeled pixels to label the resulting clusters or perform a stratified estimate using the clusters as strata is developed. Three clustering algorithms, CLASSY, AMOEBA, and ISOCLS, are compared for efficiency. Three stratified estimation schemes and three labeling schemes are also considered and compared.

N80-14773/9 PC **A03/MF A01**
Boeing Commercial Airplane Co., Seattle, WA.
Fortran Subroutines for out-of-Core Solutions of Large Complex Linear Systems.
Final Report.
E. L. Yip. Nov 79, 42p NASA-CR-159142, BCS-40283
Contract NAS1-15128

The design and usage of two main subprograms using direct methods to solve large linear complex systems, of the form Ax = b, whose coeffficient matrices are too large to be stored in core are described. The first main subprogram is for systems whose coefficient matrices are of a particular sparse structure, namely, the matrix A can be written in the form B + D, where B is a block-banded system, and D has only a few columns of nonzeros. Key elements of the algorithms used in the subprograms include: the data structure, the strategy for preserving numerical stability, the adaptability of the algorithms for dense systems as well as for block-profile systems.

N80-14780/4 PC **A03/MF A01**
Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (Germany, F.R.).
Two Fortran Programs for the Computation of the Mean Beam Pattern of a Perturbed Array.
F. Dommermuth. Nov 78, 40p
Contract BMVG-T/RF-37/71501/71300
Text in German; English Summary.

Two FORTRAN programs which perform the computation of the mean beam pattern of a sinusoidally perturbed towed array with respect to a signal having a Gaussian spectrum are presented. A mathematical expression for calculating the mean pattern, in the case of normally distributed array perturbations, is derived.

N80-14787/9 PC **A03/MF A01**
European Space Agency, Paris (France).
A Simple Procedure for Simulation of Homogenous Markhov Chains on a Computer.
T. Dahlem. Mar 79, 48p ESA-TT-529, DLR-FB-77-66
Tran-Transl. into English of 'Ein Einfaches Verfahren Zur Simulation Homogener Markoffscher Ketten Auf Einem Elektronischen Rechner', Dfvlr, Oberpfaffenhofen, (Germany, F.R.). Report Dlr-FB-77-66, Mar. 1978. Misc-Original German Report Available from Dfvlr, Cologne Dm 17,70.

The simulation of a sample set of a homogeneous Markov chain with a finite number of states using a sequence of uniform pseudo random numbers generated on a computer is described. The probability distributions corresponding to the row vectors of the transition matrix of the Markov chain are used to transform the set to a new sequence of random numbers. These are values of a member function of the stochastic process to be simulated. Two examples are presented.

N80-14791/1 PC **A04**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Computer Science.
A Project to Investigate Mechanisms and Methodologies for the Design and Construction of Communicating Concurrent Processes in Real-Time Environments.
Yearly Report, 1979.
R. H. Campbell, and K. Horton. 21 Dec 79, 55p
NASA-CR-162557, UIUCDCS-R-79-998
Grant NSG-1471

Research undertaken in 1979 into effective and appropriate mechanisms to aid in the design and construction of software for use in the flight research programs undertaken by NASA is presented.

N80-14799/4 PC **A08**/MF **A01**
Technische Universitaet, Brunswick (Germany, F.R.). Inst. fuer Angewandte Mathematik.
The Decomposition of Mixtures and Classification Using the Gradient Technique Dekomposition von Mischungen und Klassifikation mit Gradientenverfahren.
I. Grotrian-steinweg, L. Schueler, and H. Wolff.
1979, 153p BMVG-FBWT-79-07
Subm-Sponsored by Bundesmin. Der Verteidigung. Text in German; English Summary.

The classification problem, a well known and important part of the theory of pattern recognition, is dealt with. The mixture of densities governing the incoming pattern process must be decomposed. A variety of algorithms for the decomposition of these mixtures is offered. Next, a classification procedure for the case of an unknown number of pattern classes is proposed and studied in detail. It is based on estimation of the gradient of the mixture by trigonometric series expansion. Other classification methods using the gradient technique are treated as well. Also included are studies on the reduction of dimensionality. Finally, linear algorithms which are able to follow an unknown trend are presented.

N80-14805/9 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Automated Numerical Integration over a Triangle.
D. P. Laurie. Apr 79, 21p CSIR-TWISK-78

The metalgorithm concept is applied to automatic cubature over triangular regions. Special consideration is given to the computer representation of the smaller triangles generated. The design of cubature formulae with a built-in error estimate is discussed, and a 19-point formula of degree 8 that includes the points of the 7-point formula of degree 5 is derived.

PB80-124779 PC **A02**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
Sperry UNIVAC FORTEX FORTRAN IV, Release 7 R0.0.
Validation summary rept.
15 Oct 79, 20p FCVS66-VSR485

This Validation Summary Report (VSR) for the Sperry UNIVAC V77 Fortran Compiler Version 7R0.0 (VORTEX II Version 7R0.0) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1966 Fortran Standard (X3.9-1966). The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies; a section relating the categories of discrepancies to the language; and a detailed listing of discrepancies together with the tests which were failed.

PB80-125115 PC **A04**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
Sperry UNIVAC COBOL Release 4R0.0.
Validation summary rept.
15 Oct 79, 68p CCVS74-VSR480

This Validation Summary Report (VSR) for the Sperry UNIVAC V77 COBOL Compiler Version 4R0.0 (VORTEX Version 7R0.0) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB80-126352 PC **A02**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
A Survey of Vendors of COBOL Compilers for Small Computing Systems.
Final rept.,
William Holmes. Nov 79, 19p FCTC/TR-79/05

In recent years, complaints have been voiced by vendors of COBOL compilers that the COBOL language subsets defined by the Federal Standard for that language are not compatible with the language requirements supporting the typical environments found on small machines, i.e. minis and micros. Federal Property Management Regulations specify that vendors can not sell COBOL compilers to the Federal Government unless they have been certified as having met all requirements of the Federal Standard. The Federal Goverment takes the position that strict adherence to standards facilitates portability of software and data. Vendors generally are in agreement in principle, but argue that the current standard forces them to implement COBOL features that are either redundant or useless in order to do business with the Federal Government. This technical report examines this problem, analyzes the compliants and suggestions that are heard most frequently, and offers possible solutions.

PB80-133861 PC **A05**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
PLTORA: A Mini-Computer Plotting Package Introduction and User's Manual.
Technical memo.,
Jack P. Riley, Paul M. Andrus, and Wayne Ouchida. Nov 79, 90p NOAA-TM-ERL-WPL-45, NOAA-79121205

The design philosophy incorporated in the current package has been to provide a tool which allows efficient use of human resources. With PLTORA the user is able to make a quick graphical assessment of the benefits which he may or may not be realizing through a modification of a data processing algorithm. This typically means that new or intermediate forms of data must be analyzed which do not fit easily into existing plotting schemes. Obtaining a one-of-a-kind plot quickly is a primary virtue of the PLTORA package. But the second objective of PLTORA is to provide a convenient capability to produce 'publishable' quality graphics. To achieve the latter the user, of course, must expend a little more effort, especially since this depends very much on taste and the target publication.

PB80-134026 PC **A04**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
CTI Honeywell Bull COBOL-74 V-55.14-2.
Validation summary rept.
22 Jan 80, 64p CCVS74-VSR526

This Validation Summary Report (VSR) for the CII Honeywell Bull Level 64 COBOL Compiler Version 55.14-2 (GCOS L-64 Version 1-E) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The Compiler was validated at the high level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies be level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB80-804313 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Parallel Processors (Citations from the NTIS Data Base).
Rept. for 1964-Jan 80,
Brian Carrigan. Feb 80, 290p
Supersedes NTIS/PS-79/0012, NTIS/PS-78/0016, and NTIS/PS-77/0024. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-78/0017, and PB80-804321.

The bibliography cites Federally-funded research on the design, development, and application of parallel processors. Studies are included on the development of numerical techniques for parallel processing, scheduling parallel processors, and parallel processing of various kinds of scientific data. The development of algorithms and computer programs is also covered, as are specific studies on ILLIAC computers. (This updated bibliography contains 283 abstracts, 17 of which are new entries to the previous edition.)

PB80-804321 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Parallel Processors. Volume 2. 1977-January, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1977-Jan 80,
Brian Carrigan. Feb 80, 273p
Supersedes NTIS/PS-79/0013, NTIS/PS-78/0018, and NTIS/PS-77/0025. For the companion Published Search of the NTIS Data Base, see PB80-804313. See also Volume 1, 1970-1976, NTIS/PS-78/0017.

The bibliography cites worldwide research on the design, development, and application of parallel processors. Studies are included on the development of numerical techniques for parallel processing, scheduling parallel processors, and parallel processing of various kinds of scientific data. The development of algorithms and computer programs is also included, as are specific studies on ILLIAC computers. (This updated bibliography contains 269 abstracts, 105 of which are new entries to the previous edition.)

PB80-804453 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Optical Memories (Citations from the NTIS Data Base).
Rept. for 1964-Jan 80,
Brian Carrigan. Feb 80, 156p
Supersedes NTIS/PS-79/0074, NTIS/PS-78/0121 and NTIS/PS-77/0127.

Research is cited on experimental efforts towards the development of optical memories for data storage. Performance and applications studies of the optical storage devices are also cited, including holographic storage. (This updated bibliography contains 149 abstracts, 8 of which are new entries to the previous edition.)

PB80-804644 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Optical Character Recognition (Citations from the NTIS Data Base).
Rept. for 1964-Jan 79,
George W. Reimherr. Feb 80, 165p
Supersedes NTIS/PS-79/0061, NTIS/PS-78/0056, and NTIS/PS-77/0082. For the companion Published Search of the Engineering Index Data Base, see PB80-804651.

The cited reports from Federally funded research discuss the design, performance, and applications of optical character recognition devices and techniques for alphanumeric symbols. Computer recognition of handwritten characters is included. (This updated bibliography contains 158 abstracts, 6 of which are new entries to the previous edition.)

PB80-804651 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Optical Character Recognition (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 79,
George W. Reimherr. Feb 80, 250p
Supersedes NTIS/PS-79/0062, NTIS/PS-78/0057, and NTIS/PS-77/0083. For the companion Published Search of the NTIS Data Base, see PB80-804644.

The cited reports from a worldwide literature survey relate to the design, performance, and applications of optical character recognition devices and techniques for alphanumeric symbols. Computer recognition of handwritten characters is included. (This updated bibliography contains 243 abstracts, 31 of which are new entries to the previous edition.)

9C. Electrical and Electronic Engineering

AD-A078 604/6 MF **A01**
Widener Univ Chester PA Center of Engineering
Efficient Fault Analysis in Linear Analog Circuits.
Final rept. 26 May-28 Jul 79,
Alfred T. Johnson, Jr. 10 Oct 79, 81p TR-79-03, AFOSR-TR-79-1270
Grant AFOSR-79-0106
Availability: Microfiche copies only.

This report addresses the problem of high-resolution fault diagnosis in linear, analog electrical circuits in which a limited number of terminals are accessible for measurement. An efficient algorithm is described for computing network responses after a single parameter is changed. The computational complexity of this algorithm has been found to be very superior to that of a conventional algorithm. In addition, the problem of choosing a set of measurements for fault analysis has been studied. We have found necessary conditions for resolving the fault to the component level. The problems of measurement error and numerical conditioning have also been studied. (Author)

AD-A078 944/6 PC **A03**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Compatibility, Electromagnetic.
Final rept. on test operations procedures.
12 Oct 79, 30p Rept no. TOP-6-2-560
Supersedes Rept. no. MTP-6-1-006, dated 31 Jul 70, AD-876 130. See also Rept. no. TOP-2-2-613, AD-775 441 and Rept. no. TOP-6-2-542, AD-775 446.

This Test Operations Procedure (TOP) provides methods for determining the electromagnetic compatibility of communications-electronics (C-E) equipment. It describes procedures to determine that C-E equipment and systems incorporate the best available technology for securing freedom from interference and that concepts for their use assure mutural compatibility with the resultant electromagnetic environment. (Author)

N80-14339/9 PC **A09**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
Numerical Simulation of Dynamics of Brushless DC Motors for Aerospace and Other Applications. Volume 1: Model Development and Applications, Part B.
Final Report.
N. A. O. Demerdash, and T. W. Nehl. 1979, 179p NASA-CR-160355
Contract NAS9-15091

A mathematical model was developed and computerized simulations were obtained for a brushless dc motor. Experimentally obtained oscillograms of the machine phase currents are presented and the corresponding current and voltage waveforms for various modes of operation of the motor are presented and discussed.

N80-14340/7 PC **A09**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
Numerical Simulation of Dynamics of Brushless DC Motors for Aerospace and Other Applications. Volume 2: User's Guide to Computer Ema Model.
Final Report.
N. A. O. Demerdash, and T. W. Nehl. 1979, 185p NASA-CR-160356
Contract NAS9-15091

A description and user's guide of the computer program developed to simulate the dynamics of an electromechanical actuator for aerospace applications are presented. The effects of the stator phase currents on the permanent magnets of the rotor are examined. The voltage and current waveforms present in the power conditioner network during the motoring, regenerative braking, and plugging modes of operation are presented and discussed.

PB80-124936 PC **A03**/MF **A01**
Electricity Council Research Centre, Capenhurst (England).
The Electricity Supply Network in England and Wales and Electric Metal Melting.
R. D. Langman. Aug 78, 31p ECRC/M1167

Melting loads are not geographically distributed in an even manner and the supply system needs to accommodate these concentrated loads in a way which does not cause problems to other consumers of electricity. The UK supply system is described briefly and the various forms which melting furnaces can take are also discussed. The melting process used on a furnace type could influence the electrical behavior of a furnace on to the system. The paper reviews the interaction of furnace configuration, melting process and supply network, highlighting those aspects which relate to the disturbances caused by melting units. The way in which such disturbances arise is introduced, justifying the need for engineering recommendations relating to the connection of melting furnaces to the network.

9D. Information Theory

AD-A078 415/7 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science
Digitalized Signatures and Public-Key Functions as Intractable as Factorization,
Michael O. Rabin. Jan 79, 16p Rept no. MIT/LCS/TR-212
Contract N00014-75-C-0661

We introduce a new class of public-key functions involving a number n = p.q having two large prime factors. As usual, the key n is public, while p and q are the private key used by the issuer for production of signatures and function inversion. These functions can be used for all the applications involving public-key functions, including digitalized signatures. We prove that for any given n, if we can invert the function y = E sub n(x) for even a small percentage of the values y then we can factor n. Thus as long as factorization of large numbers remains practically intractable, for appropriately chosen keys not even a small percentage of signatures are forgerable. Breaking the RSA function is at most as hard as factorization, but is not known to be equivalent to factorization even in the weak sense that ability to invert all function values entails ability to factor the key. Computation time for these functions, i.e., signature verification, is several hundred times faster than for the RSA scheme. Inversion time, using the private key, is comparable. The almost-everywhere intractability of signature-forgery for our functions (on the assumption that factoring is intractable) is of great practical significance and seems to be the first proved result of this kind.

AD-A078 490/0 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Information and Decision Systems
Multiple Integral Expansions for Nonlinear Filtering.
Interim rept.,
S. K. Mitter, and D. Ocone. Sep 79, 8p LIDS-P-943, AFOSR-TR-79-1256
Grant AFOSR-77-3281

In their seminal paper, Fujisaki, Kallianpur and Kunita showed how the best least squares estimate of a signal contained in additive white noise can be represented as a stochastic integral with respect to innovation process, the integral being adapted to the observation process. The difficulty with this representation is that in general this estimate is not useful for computing the estimate since the innovations process depends on the estimate of the signal itself. In this paper we discuss representation of the estimate directly in terms of the observation process. In doing so, we derive new results on multiple integral expansions for square-integrable functionals of the observation process and show the connection of this work to the theory of contraction operators on Fock space. This letter development is due to Nelson and Segal. We also present several applications of these results to determining sub-optimal filters. (Author)

AD-A078 745/7 PC **A03**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Signal Reconstruction from Phase or Magnitude.
Technical note,
Monte Hayes, Jae S. Lim, and Alan V. Oppenheim. 16 Sep 79, 38p TN-1979-64, ESD-TR-79-228
Contract F19628-78-C-0002

In this paper, we develop a set of conditions under which a sequence is uniquely specified by the phase or samples of the phase of its Fourier transform, and a similar set of conditions under which a sequence is uniquely specified by the magnitude of its Fourier transform. These conditions are distinctly different from the maximum or minimum phase conditions, and are applicable to both one-dimensional and multi-dimensional sequences. Under the specified conditions, we also develop several algorithms which may be used to reconstruct a sequence from its phase or magnitude. As a potential application area, the results of this paper are applied to the blind deconvolution problem of digital images blurred by a symmetric point spread function. (Author)

N80-14782/0 PC **A06**/MF **A01**
Marconi Co. Ltd., Chelmsford (England). Theoretical Support Services.
Analytic Techniques for Processing Signal and Noise Through a Nonlinear Channel Using MODSIM. Volume 2: MODSIM Software Description.
S. G. Brazier, and B. G. West. Dec 77, 112p ESA-CR(P)-878-V-2
Contract ESTEC-2327/74-HP
Seri-3.

A description of the computer program implementation of an analytic technique is presented, which was developed to study the behavior of a signal in a noisy nonlinear channel. Greater economy in the running of the simulation program MODSIM can be achieved by using analytical techniques to account for the effect of noise instead of performing multiple runs with different noise samples where it is difficult to assess the confidence limits. Three mathematical techniques were studied which can be used to perform the analysis. The method most applicable uses a polynomial expansion of the nonlinear device characteristics. The noise after the nonlinear device is characterized by its autocorrelation function. For volumes 1 and 3 see ESA 93206 and 93208.

N80-14783/8 PC **A06**/MF **A01**
Marconi Co. Ltd., Chelmsford (England). Mathematical Physics and Circuitry Group.
Analytic Techniques for Processing Signal and Noise Through a Nonlinear Channel Using MODSIM. Volume 3: Curve Fitting Software Description.
S. G. Brazier. Dec 77, 109p ESA-CR(P)-878-V-3
Contract ESTEC-2327/74-HP
Seri-3.

The curve fitting software implementation of the analytic techniques developed for processing signal plus noise in a nonlinear channel is described. The method which provides an economic alternative to the Monte Carlo methods used in simulation programs such as MODSIM is described. The program fits either a polynomial or a series of Bessel functions to a set of data defining the complex voltage transfer characteristics of a device. FORTRAN 4 language was used in an ICL 4/70 computer.

N80-14785/3 PC **A04**/MF **A01**
Marconi Co. Ltd., Chelmsford (England). Theoretical Support Services.

Supplement to: Analytic Techniques for Processing Signal and Noise Through a Nonlinear Channel Using MODSIM. Volume 2: Moment Software Description.
S. G. Brazier, and P. G. Wright. Dec 77, 60p ESA-CR(P)-1228-V-2
Contract ESTEC-1327/74-HP-RIDER-1
Seri-3.

The moment software implementing the analytic techniques that were developed for processing signal plus noise in a non-lincar channel is described. The purpose of the method is to provide an economical alternative to the Monte-Carlo methods used in simulation programs such as MODSIM. Channels are considered which consist of a filter followed by a memoryless non-linear device and then a further filter. A program was developed to generate the moments of the noise at the output of the non-linear device. The noise probability density function is approximated by a weighted sum of Gaussian density functions. The joint density function in time is obtained by matching the noise moments to the second order properties of the noise. Processing through the second filter is then achieved using characteristics functions.

N80-14786/1 PC **A11**/MF **A01**
Marconi Co. Ltd., Chelmsford (England). Theoretical Support Services.
Analytic Techniques for Processing Signal and Noise Through a Nonlinear Channel Using MODSIM. Volume 3: General Theoretical Techniques.
L. M. Mclaughlin. 1977, 245p ESA-CR(P)-1228-V-3
Contract ESTEC-2327/74-HP
Seri-3.

The general theoretical techniques used to develop the analytic techniques used for processing signal plus noise in a non-linear channel are described. The purpose is to provide an economical alternative to the Monte-Carlo methods used in simulation programs such as MODSIM. Channels are considered which consist of a filter by a memoryless nonlinear device and then a further filter. A program was developed to generate the moments of the noise at the output of the non-linear device. The noise probability density function is approximated by a weighted sum of gaussian density functions. The joint density function in time is obtained by matching the noise moments to the second order properties of the noise. Processing through the second filter is then achieved using characteristics functions.

N80-14788/7 PC **A08**/MF **A01**
European Space Agency, Paris (France).
'PROCOPES'. (Conversational Program for Signal Analysis): Evolvement of an Interpretative Control Language.
Ph.D. Thesis - Univ. de Paris-Sud.
J. P. Boisseau. Oct 79, 170p ESA-TT-581, ONERA-NT-1978-8
Tran-Transl. Into English of 'Procopes', (Programme Conversationnel pour l'Etude du Signal): Evolution Vers UN Langage de Commande Interpretatif', Onera, Paris Report Onera-NT-1978-8, 6 Sep. 1978. Misc-Original Report in French Previously Announced as N79-32883.

Results of work with a computer piloted signal processing system are reported. The complexity of the analysis instrumentation, the diversity of processing requested by the users, and the orientation toward self-service showed the necessity of implementing an evolutive, conversational system with a simple command language which, at the same time, optimizes the use of the computer central unit. The first version of PROCOPES, has been operational since 1974 and, since then, its evolution has been partly guided by the remarks or needs of users. The study of a more sophisticated command language is presented. The work was carried out, on now obsolescent hardware, within the framework of signal processing based on digitization, a processing method that has become generalized with the appearance of new hardware, such as Array Processors associated with minicomputers of the new generation. Two examples of the use of this command language are presented. The interest of integrating this type into present-day hardware is discussed.

9E. Subsystems

AD-A078 522/0 PC **A03**/MF **A01**
TRW Defense and Space Systems Group Redondo Beach CA
Monolithic Microwave Preamplifier.
Technical rept. no. 2, 1 Apr 78-30 Jun 79,
A. Benavides, R. Kaelberer, and K. Weller. Sep 79, 39p Rept no. TRW-251-028
Contract N00014-77-C-0645

During the initial phase of this contract, TRW developed a computer model for GaAs Microwave Field-Effect Transistors, in order to study the noise and gain properties of such devices for different channel doping densities and geometry configurations. This model has proven to be accurate when compared against measured results of noise figure, S parameters, and temperature effects on noise figure of FET devices. At the present, TRW has made use of this computer model in designing a low noise integrated preamplifier to operate at X-band. The theoretical design of this amplifier is the subject of the present report. (Author)

AD-A078 627/7 PC **A02**/MF **A01**
Harry Diamond Labs Adelphi MD
A New Approach to the Design of Highly Efficient Regulated DC-to-DC Converters.
Technical memo.,
Philip M. Cowett, Jr. Oct 79, 17p Rept no. HDL-TM-79-29

This report describes a novel approach to the design of efficient switching regulated dc-to-dc converters whereby an energy storage inductor and a commutating diode are in the output transformer primary circuit of the converter. This design has advantages of simplicity, economy, reliability in applications where high-output voltages, multiple-output voltages, or both are involved. (Author)

AD-A078 712/7 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Printed Circuit Antennas for Solving Various Instrumentation Problems.
Raymond E. Wilton. 13 Nov 79, 25p Rept no. AFGL-TR-79-0266
Pub. in Proceedings of the Workshop on Printed Circuit Antenna Technology, 17-19 Oct 79, Las Cruces, NM, p22-1-22-24.

No abstract available.

AD-A078 750/7 PC **A03**/MF **A01**
Ohio State Univ Columbus Electroscience Lab
Pointing Accuracy and Dynamic Range in a Steered Beam Adaptive Array.
Technical rept.,
R. T. Compton, Jr. Nov 79, 34p Rept no. ESL-711847-4
Contract N00019-79-C-0291

This report examines the performance of a steered beam adaptive array as a function of the beam pointing error. The purpose is to determine how close the steered beam has to be to the actual desired signal arrival angle for good performance. It is shown that the beam pointing error that can be tolerated is essentially a question of dynamic range. The greater the desired signal dynamic range that must be accommodated by the array, the more accurate the beam pointing angle must be. (Author)

AD-A078 847/1 PC **A06**/MF **A01**
Naval Surface Weapons Center White Oak Lab Silver Spring MD
An Active Filter Primer.
Final rept.,
Arthur D. Delagrange. 1 Mar 79, 102p Rept no. NSWC/TR-79-137

This report gives the basics of active filter design, both theory and practice. It is based on a seminar given in the Signal Processing Branch of the Surface Antisubmarine Warfare Division. It will be of interest to persons working in the fields of analog filter design or signal processing. (Author)

AD-A078 860/4 PC **A04**/MF **A01**
RCA Advanced Technology Labs Camden NJ
Analog Binary Programmable Transversal Filter.
Interim rept. 30 Sep 77-31 Aug 78,
D. A. Gandolfo, and J. R. Tower. Jun 79, 64p RADC-TR-79-135
Contract F19628-77-C-0263

The objective of this program is to develop a programmable CCD (Charge-Coupled Device) circuit capable of correlating a variety of binary-coded waveforms. This analog-binary correlator will store a binary waveform as a reference, and will then compare newly arriving signals to the reference waveform. In general, the signal will be a binary code that has been corrupted in the transmission channel so that upon arrival at the receiver, it really has an analog character (i.e., the amplitude varies continuously). Analog-binary correlation techniques have an important advantage over purely digital approaches. If the analog signal is directly compared to the reference, only a single correlation channel is required, whereas a digital correlator requires a separate channel for each bit of resolution in the analog-to-digital converter. Thus, a reduction in parts count, with attendant improvements in size, cost and reliability, is realized with the CCD correlator. The correlator is an important device because correlation of binary waveforms is a function widely used in spread spectrum systems, which offer important advantages for military communications and radar applications. Spread spectrum advantages include jam resistance, reduced detectability and improved signal-to-noise ratio for given transmitter power. Thus, the device whose design is described here should be broadly useful in military systems.

AD-A078 958/6 PC **A02**/MF **A01**
Rockwell International Thousand Oaks CA Science Center
Ion Implanted GaAs I.C. Process Technology.
Quarterly technical rept. no. 8, 1 Apr-30 Jun 79,
F. H. Eisen, and S. I. Long. Aug 79, 22p SC5110.18QR, AFOSR-TR-79-1268
Contract F49620-77-C-0087, ARPA Order-3384-2

This report covers the third quarter, Phase II of a program on ion implanted planar GaAs integrated circuit technology. The overall objective of this program is the development of a manufacturable process for high-speed low-power GaAs logic circuits. The goal for Phase I was to establish the technology, and demonstrate its viability by fabricating circuits reaching MSI complexity. The goal for Phase II is to achieve the capability of fabricating GaAs ICs of LSI complexity. The program involves the Rockwell International Electronics Research Center and three subcontractors: Cal Tech, Cornell University and Crystal Specialties, Inc. The most important aspects of the work carried out in this quarter were the gaining of further insight into the causes for conversion of unqualified GaAs substrates, the fabrication of wafers with mask set AR3, and the preparation for evaluating the 3 x 3 parallel multiplier, a new circuit on AR3. This circuit will provide vital information for the design of the more complex circuits, on mask set AR4.

N80-14289/6 PC **A02**/MF **A02**
National Aeronautics and Space Administration, Langley Station, VA. Langley Research Center.
Resonant Frequency of Microstrip Antennas Calculated from Te-Excitation of an Infinite Strip Embedded in a Grounded Dielectric Slab.
M. C. Bailey. Nov 79, 18p NASA-TM-80190

The calculation of currents induced by a plane wave normally incident upon an infinite strip embedded in a grounded dielectric slab is used to infer the resonant width (or frequency) of rectangular microstrip antennas. By placing the strip inside the dielectric, the effect of a dielectric cover of the same material as the substrate can be included in the calculation of resonant frequency. A comparison with measured results indicated agreement of 1 percent or better for rectangular microstrip antennas constructed on Teflon-fiberglass substrate.

N80-14328/2 PC **A06**/MF **A01**
European Space Agency, Paris (France).
Computation of the Radiation Characteristics of Antennas on Complicated Structures in the High Frequency Case. Principle of the Geometrical Theory of Diffraction.
A. Schrott. May 79, 109p ESA-TT-593, DFVLR-FB-78-02
Tran-Transl. Into English of "Berechnung der Strahlungscharakteristik von Antennen Auf Kom-

plizierten Koerpern im Hochfrequenzfall: Prinzip der Geometrishcen Beugungstheorie", Rept. Dfvlr-FB-78-02 Dfvlr, Oberpfaffenhofen, (Germany, F.R.) 26 Jan. 1978. Misc-Original Report in German Previously Announced as N79-16184.

The geometrical theory of diffraction is used to determine the radiation characteristics of antennas on complicated structures, such as satellites and aircrafts and the scattering at these structures in the high frequency case. For the solution, the complicated structures were divided into canonical forms which can be analyzed by rigorous asymptotic methods. Beside the ray-optical construction of the high frequency field, the important canonical problem of the diffraction at an edge was treated extensively. The diffraction coefficients for the computation of the diffracted field are presented. The problem of vertex diffraction is discussed.

N80-14917/2 PC **A04**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Nonadiabatic Energy Transfer Between Coupled L-C Resonators and Its Possible Applications to High-Power RF Pulse Generation.
I. Sato, K. Minami, and K. Ishii. Sep 79, 53p IPPJ-32

A principle of high-power RF pulse generation available in nuclear fusion research is proposed. The RF energy stored in L-C resonators with variable resonant frequencies is transferred to a load resonator when the frequency crossing occurs. Successive energy transfers from resonators result in a sustained RF oscillation at the load. It is emphasized that the successive triggering is not required in the present method. This simplifies substantially the operation of the RF generators. The principle is analyzed and numerically calculated for practical experimental conditions. An example of the conceptual designs of the variable inductor used in the present method is shown. At the frequency 1 MHz (4 MHZ), the output 110 kW (440 kW) and the pulse width 24 sec (6 micron sec) are expected, if one uses tow toroidal ferrite cores with a major radius 0.5m and a minor radius 0.2m.

PAT-APPL-6-065 472 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Repressed Amplifier for Mode Locked Oscillator.
Patent Application,
Meyer Gilden. Filed 10 Aug 79, 17p AD-D006 756/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention comprehends a non-linear amplifier circuit which together with a multimode oscillator provides a stable comb spectrum generator or alternatively, a stable rf pulse generator. The nonlinear amplifier circuit includes a transistor amplifier with the supply voltage reduced to a critical range, typically about 4 V. The circuit parameters in conjunction with the transistor, are selected such that the average input threshold level, above which an output response occurs, increases with increasing pulse amplitude. The circuit is designed so that the time constant for the threshold level exceeds the pulse repetition period. It is also designed so that the value of small signal gain of the repressed amplifier allows the oscillator to be self-starting under all conditions. (Author)

PAT-APPL-6-065 678 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Mode Filter Apparatus.
Patent Application,
R. S. Hart . Filed 10 Aug 79, 18p AD-D006 757/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a mode filter apparatus for preventing unwanted modes in a multi-moded structure utilizing a radial plurality of resonant slots on the bottom of the filter cavity. The top of the filter cavity includes a variable height center section to provide mode selectivity in cooperation with the resonant slots. (Author)

PAT-APPL-6-073 584 PC **A03**/MF **A01**
Department of the Air Force Washington DC
Subarray Pattern Control and Null Steering for Subarray Antenna Systems.
Patent Application,
Robert J. Mailloux. Filed 7 Sep 79, 31p AD-D006 766/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Improved performance of an electronically scanned subarray antenna system is realized by tailoring the subarray pattern in a manner that reduces the undesirable effects of illumination truncation at the edge of the main array. This is accomplished by introducing variable attenuators into individual feed element array output. The improvement permits effective utilization of deterministic and adaptive nulling at both the main array and the subarray levels and further provides a system ability to scan over wide spatial angles with wide bandwidths and low sidelobes. The technique is adaptable to both space fed and constrained subarray antenna systems. (Author)

PAT-APPL-6-077 058 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Power Supply Sequencing Apparatus.
Patent Application,
James E. Buchanan. Filed 19 Sep 79, 10p AD-D006 770/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This patent application covers a power supply sequencing apparatus utilizing a pair of MOS-FET devices to simultaneously apply or remove the positive and negative power supply sources to an electronic unit. (Author)

PATENT-3 403 405 Not available NTIS
Department of the Navy Washington DC
Telescoping Folded Monopole with Capacitance at Input.
Patent,
Richard Barrar, and Albert R. Giddis. Filed 8 Jun 65, patented 24 Sep 68, 4p AD-D006 787/6, PAT-APPL-424 449
Supersedes PAT-APPL-424 449-65.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

It is an object of this invention to provide a tunable broadband folded monopole antenna capable of operation over an extended range which may be simply matched to its driving source. Another object is to provide a structurally simple, inexpensive, easily tunable, for extending the frequency range of the antenna below its physical limitations.

PATENT-4 155 089 Not available NTIS
Department of the Navy Washington DC
Notched/Diagonally Fed Twin Electric Microstrip Dipole Antennas.
Patent,
Cyril M. Kaloi. Filed 31 Oct 77, patented 15 May 79, 12p AD-D006 785/0, PAT-APPL-847 331
Supersedes PAT-APPL-847 331-77, AD-D004 469.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to twin electric microstrip dipole antennas consisting of thin electrically conducting rectangular shape elements formed on both sides of a dielectric substrate. In these antennas the element on one side of the substrate is the mirror image of the element on the other side of the substrate. Each of the elements act, in effect, as a ground plane for the other. The thickness of the substrate to a large extent determines the bandwidth of the antenna and the length of the conducting elements on both sides of the substrate determines the resonant frequency. (Author)

PATENT-4 157 548 Not available NTIS
Department of the Navy Washington DC
Offset Fed Twin Electric Microstrip Dipole Antennas.
Patent,
Cyril M. Kaloi. Filed 31 Oct 77, patented 5 Jun 79, 13p AD-D006 784/3, PAT-APPL-847 456
Supersedes PAT-APPL-847 456-77, AD-D004 472.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to twin electric microstrip dipole antennas consisting of thin electrically conducting rectangular shape elements formed on both sides of a dielectric substrate. In these antennas the element on one side of the substrate is the mirror image of the element on the other side of the substrate. Each of the elements act, in effect, as a ground plane for the other. The thickness of the substrate to a large extent determines the bandwidth of the antenna and the length of the conducting elements on both sides of the substrate determines the resonant frequency. (Author)

PATENT-4 170 037 Not available NTIS
Department of the Interior, Washington, DC.
Lock-Out Logic Circuit for Inverter Protection.
Patent,
Donald S. Kimmel. Filed 4 Aug 78, patented 2 Oct 79, 9p PB80-120322, PAT-APPL-931 067
Supersedes PB-288 617.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent relates to a lock-out control logic circuit for a feedback inverter system, which senses the load current in each load switching element of the inverter system and utilizes the sensed current through the presently conducting load switching element to inhibit the next firing of the presently non-conducting load switching element. Current transformers are inserted in series with each switching element and coupled to a CMOS logic circuit which inhibits the firing pulse to a non-conducting load switching element in the event a current conduction condition is sensed.

PATENT-4 177 464 Not available NTIS
Department of the Air Force Washington DC
Multiplexing of Multiple Loop Sidelobe Cancellers.
Patent,
Raymond J. Masak. Filed 13 Nov 78, patented 4 Dec 79, 5p AD-D006 799/1, PAT-APPL-960 207
Supersedes PAT-APPL-960 207-78, AD-D005 686.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a sidelobe canceller in which the undesired signals in the main antenna channel are cancelled at RF using signals from multiple auxiliary antennas, where each auxiliary antenna signal has been weighted in a vector modulator while at RF. The weighted is determined in a single wideband IF loop by multiplexing the multiple auxiliary antenna signals through the same auxiliary receiver, correlator and demodulator. The demodulated output signal from each auxiliary antenna is sampled and retained as a weighting to adjust the vector modulator for the corresponding auxiliary antenna. A timing and control circuit coordinates the multiplexing and sampling functions. (Author)

PATENT-4 177 493 Not available NTIS
Department of the Air Force Washington DC
High Voltage Antenna Protection System.
Patent,
Emmanuel E. Bliamptis. Filed 29 Dec 77, patented 4 Dec 79, 4p AD-D006 797/5, PAT-APPL-865 753
Supersedes PAT-APPL-865 753-77, AD-D005 676.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A device for the protection of antennas against lightning and electromagnetic pulse consists of an electrically conducting rotor that is free to turn on a conducting shaft which is connected to the antenna. This combination is placed within an electric

coil with one end connected to ground. The rotor is mounted eccentrically within the coil so that when a predetermined critical voltage on the antenna is exceeded electrical current flows through the rotor, and coil to ground via the air gap separating the rotor and coil, a magnetic field is set up in the coil which turns the rotor and reduces the air gap as the voltage is dissipated, after discharge of the surge, the rotor returns to its quiescent position. (Author)

PATENT-4 180 725 Not available NTIS
Department of the Air Force Washington DC
Grating Apparatus for Static Crossed Field Photomultipliers.
Patent,
Wayne G. Abraham, Richard S. Enck, Jr., Ronald H. Goehner, and Robert V. Brick. Filed 11 May 78, patented 25 Dec 79, 3p AD-D006 789/2, PAT-APPL-904 965
Supersedes PAT-APPL-904 965-78, AD-D005 088.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Gating apparatus for a static crossed field photomultiplier utilizing a gating electrode which is mounted in a position between the cathode and the rail electrode is described. The gating electrode is pulsed thus causing the cathode current to be either multiplied or diverted so as to modulate the current by shifting the cathode beam into and out of the dynode area where secondary amplification occurs. (Author)

9F. Telemetry

AD-A078 803/4 PC **A04**/MF **A01**
Pacific Missile Test Center Point Mugu CA
Minicomputer Controlled System for Testing Telemetry Receiving and Recording Systems.
Technical publication,
E. L. Law, and G. J. Harbold, Jr. 10 Oct 79, 53p Rept no. PMTC-TP-79-30

This report describes a minicomputer controlled system for testing telemetry receiving and recording stations and presents sample test results. Details of the interface between the minicomputer and the test equipment are also presented. The system can test a telemetry receiving and recording station in about one/fifth the time it takes to manually test the station. The test results are printed out and can be stored on the computer for trend analysis and other statistical analyses. The system accuracy is + or - 1.0 dB or better for all tests. The results of the various tests correlate well with each other and with manually performed tests. It has been demonstrated that a minicomputer controlled system can perform a good, fast, accurate test on a telemetry receiving and recording station. (Author)

N80-14182/3 PC **A09**/MF **A01**
Acurex Corp., Mountain View, CA. Autodata Div.
Phase-Locked Telemetry System for Rotary Instrumentation of Turbomachinery, Phase 1.
Final Report.
A. Adler, and B. Hoeks. Sep 78, 192p NASA-CR-159453, ACUREX-78-284
Contracts NAS3-20290, ACUREX PROJ. 6497

A telemetry system for use in making strain and temperature measurements on the rotating components of high speed turbomachines employs phase locked transmitters, which offer greater measurement channel capacity and reliability than existing systems which employ L-C carrier oscillators. A prototype transmitter module was tested at 175 C combined with 40,000 g's acceleration.

N80-14327/4 PC **A05**/MF **A01**
European Space Research and Technology Center, Noordwijk (Netherlands).
S + S/X Bands Coherent Transponder Specification.
Mar 79, 84p ESA-PSS-48(TTC.C.10)-ISSUE-1

A design requirement standard, related to the telemetry, tracking, command, and data handling standards of the European Space Agency (ESA), is presented. A class of S and S/X bands TTC and ranging transponders which will find increasing application on future ESA spacecraft is described. Since these spacecraft will impose different requirements on the transponder (frequencies, modulation schemes, etc.), a modular construction allowing maximum flexibility and reuse of the same fundamental hardware in a succession of programs, without major costs for modification, is emphasized. The transponder in its various versions is to be fully compatible with ESA and NASA ground networks.

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

AD-A078 653/3 PC **A03**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme CA
Solar-Powered Sun Tracker.
Final rept. Feb 77-Sep 79,
Carter J. Ward. Jun 79, 33p Rept no. CEL-TN-1556

A solar-powered sun tracker believed to be capable of repositioning equipment to within 1 degree of the angle-of-incident radiation is described in this report. The proposed tracker is designed to reposition itself automatically after cloudy periods and should prove inexpensive as well as reliable. Included in this report are (1) a description of two tracker concepts, (2) a derivation of the heat-balance equation used to predict work available for equipment rotation, (3) a discussion of the experimental model fabricated to prove concept feasibility, and (4) an economic analysis comparing the cost of generating steam with a solar-powered boiler with the cost of generating steam with a coal-fired boiler. (Author)

N80-14497/5 PC **A02**/MF **A01**
Wyle Labs., Inc., Huntsville, AL. Solar Energy Systems Div.
Thermal Performance Evaluation of the Suncatcher SH-11 (Liquid) Solar Collector.
Jul 80, 22p NASA-CR-161253
Contract NAS8-32036
Subm-Prepared for DOE.

The procedures used and the results obtained during the evaluation test program on the Solar Unlimited, Inc., Suncatcher SH-11 (liquid) solar collector are presented. The flat-plate collector case assembly is made of .08 inch aluminum 3003 H14 riveted with fiberglass board insulation. The absorber consists of collared aluminum fins mechanically bonded to 3/8 inch copper tubing and coated with 3M Nextel black. Water is used as the working fluid. The glazing is made of a single glass, 1/8 inch water white, tempered and antireflective. The collector weight is 85 pounds with overall external dimensions of about 35.4 in x 82.0 in x 4.0 in. Thermal performance data on the Solar Unlimited Suncatcher SH-11 solar collector under simulated conditions were conducted using the MSFC Solar Simulator.

N80-14498/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Development and Testing of the Solar Control Corporation Modular Controller and Solarstat Subsystem.
Final Report.
J. D. Hankins. Aug 79, 15p NASA-TM-78243
Contract NAS8-32258
Subm-Prepared for DOE Prepared by Solar Control Corp., Boulder, Colo.

Results of development work on an existing controller and solarstat subsystem for use with solar heating and cooling systems are presented. The deliverable end items, program objectives, and how they were accomplished are described. It is shown that the products developed are marketable and suitable for public use.

N80-14500/6 PC **A03**/MF **A01**
Wyle Labs., Inc., Huntsville, AL.
Results of Thermal Performance Evaluation of the Owens-Illinois Sunpack Liquid Solar Collector at Indoor Conditions.
10 Oct 79, 28p NASA-CR-161189
Contract NAS8-32036
Subm-Prepared for DOE.

Test procedures and results of the thermal performance of a liquid, evacuated tube, solar collector under simulated conditions are presented. The collector tested was a module used on the early demonstration projects.

PB80-120520 PC **A04**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Design for Evaluation of the CSA Emergency Energy Conservation Services Program: Operational Problems Impeding Implementation of the CSA Emergency Energy Conservation Services Program.
18 Jul 78, 60p CSA/LN-2404
Contract CSA-B7B-5547

The report is organized into three main sections. Chapter 2.0 summarizes the major problem areas identified by respondents, provides background on the research, describes data collection techniques used, and comments on the nature and quality of the data base. Chapter 3.0 investigates whether the variation in Regional Office administration or grantee characteristics has influenced the identification of problems by grantees. Chapter 4.0 identifies those operational problems on which future action by CSA can have the most effect.

PB80-124217 PC **A03**/MF **A01**
Minnesota Energy Agency, St. Paul.
Analysis of Energy Use in Minnesota Institutional Buildings.
Eric Hirst. Nov 79, 40p MEA-11/79/2

This report discusses data collected for the Minnesota Energy Agency on energy use and building characteristics for 1952 buildings owned by public school districts and local government in Minnesota. Information on each building includes year constructed, heated and air conditioned floorspace, occupancy, type of building, annual fossil fuel type(s), use, and costs, and annual electricity use and cost.

PB80-124225 PC **A03**/MF **A01**
Minnesota Energy Agency, St. Paul.
Understanding Residential/Commercial Energy Conservation: The Need for Data,
Eric Hirst. Oct 79, 45p MEA-79/10/3
Presented at a Conference on the Choice and Utilization of Energy Using Durables Held at Boston, MA. on November 1-2, 1979.

This report reviews data dealing with energy use in residential and commercial buildings and their determinants. Three types of data are discussed: data prepared by and for the federal government on overall trends in buildings energy use, data prepared by and for the federal government related to the details of energy use, and data collected at the state and utility level.

PB80-125651 PC **A02**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Energy Programs at the Johns Hopkins University Applied Physics Laboratory, Quarterly Report July-September 1979.
Oct 79, 25p JHU/APL/EQR/79-3
Sponsored in part by Department of Energy, Washington, DC. See also PB-301 245.

The Johns Hopkins University Applied Physics Laboratory, under contracts with agencies of the federal government and the State of Maryland, is engaged in developing energy resources, utilization concepts, and storage methods. This report summarizes the work as of 30 September 1979. The first section, Geothermal Energy Development Planning, reports progress of various geothermal-related tasks. The tasks include the ongoing Atlantic Coastal Plain Geothermal Energy Market Survey, Delmarva Geothermal Development Prospectus, analysis geothermal energy at Crisfield, Md., analysis of the Crisfield well data, and comments on limited tasks. The second section, Operational Research, Hydroelectric Power Development, contains reports on the survey of small-scale hydroelectric in the southeastern states; analysis of institutional, legal, environmental, and economic factors, and a report on limited tasks in

this area pursued during this quarter. The third section, Power Plant Site Evaluation, contains a report on landfill methane recovery. The fourth section, Energy Conversion and Storage Techniques contains a report on liquefied natural gas safety evaluation.

PB80-132202 PC A05/MF A01
General Accounting Office, Washington, DC. Community and Economic Development Div.
Water Supply Should Not Be An Obstacle to Meeting Energy Development Goals.
Report to the Congress.
24 Jan 80, 92p CED-80-30

This report disputes the common impression that the energy industry's thirst for water will create severe shortages throughout the water-short, energy-rich West. Recent evidence indicates that these predictions are unfounded or outdated and that adequate water is available for energy development through at least the year 2000.

PB80-135619 PC A07/MF A01
Living Systems, Winters, CA.
Indio, California Energy Conservation Project.
Final rept.,
Marshall Hunt, Dave Bainbridge, Bruce Maeda, Jon Hammond, and Bill Kopper. 16 Mar 77, 141p HUD-0000220
Grant HUD-B-75-SI-06-0502

The City of Indio, Calif., developed a local energy conservation program to demonstrate the type of planning and implementation practical for cities with populations under 20,000. The project staff began by collecting data, reviewing building codes, analyzing the climate, and analyzing the environmental impact of both current and proposed planning and building practices. This review revealed that current building codes actually discourage energy conservation. These codes mandate unusable side yard space, large ornamental front yards, and fairly small back yards which taken together (1) encourage sprawl and increase the area covered with pavement heat problems; (2) increase the distance residents must travel, discouraging walking; and (3) remove land from agricultural use. Commercial codes paid little attention to the use of overhangs and techniques to reduce heat retention. Safe walkways and bicycle paths were not routinely considered in planning. Commercial buildings were generally overlit, with city - owned buildings the worst offenders. Since Indio's climate is predominantly hot and dry, most of the suggestions focus on ways to cut air conditioning costs, although many of the techniques would also cut heating costs. Diagrams show how landscaping, overhangs, and window design reduce heat gain. Building materials are evaluated and various residential and commercial design changes are illustrated. An energy - saving checklist is included as are tabular data, technical appendices, and a bibliography.

10B. Power Sources

AD-A078 341/5 PC A10/MF A01
Air Force Aero Propulsion Lab Wright-Patterson AFB OH
Proceedings of the AFAPL Generator and Motors Seminar (1st), Held at Wright-Patterson AFB, Ohio in October 1977.
Interim rept. 1 Oct-1 Jul 79,
Hugh L. Southall, J. L. McCabria, Sam Noodleman, M. S. Isaacson, and W. F. Weldon. Aug 79, 206p Rept no. AFAPL-TR-79-2090

A seminar was held at Wright-Patterson AFB in October 1977 to provide for government, industry, and university presentations on the latest developments in generator and motor technology. In addition, the mathematical modeling of generator and motors was the subject of other presentations at the meeting. This Technical Report organizes and publishes presentations made at the seminar. (Author)

AD-A078 424/9 PC A05/MF A01
Air Force Aero Propulsion Lab Wright-Patterson AFB OH
Permanent Magnet and Superconducting Generators in Airborne, High Power Systems.
Interim rept. 1 Feb 78-31 Mar 79,
Hugh L. Southall, and Frederick C. Brockhurst. Aug 79, 99p Rept no. AFAPL-TR-79-2073

This report presents results of a study performed to compare airborne, high power supplies at power levels of 10 and 20 MW utilizing permanent magnet and superconducting generators. Algorithms for the weight and volume of these electrical generators are presented and algorithms for the other power supply components are used to predict total system weights for seven point designs at the two power levels. (Author)

AD-A078 473/6 PC A05/MF A01
American Univ Washington DC
The Preparation of Some Novel Electrolytes: Synthesis of Partially Fluorinated Alkanesulfonic Acids as Potential Fuel Cell Electrolytes.
Final technical rept.,
C. Bunyagidj, H. Pietrowska, and M. H. Aldridge. Sep 79, 77p
Contract DAAK70-77-C-0047

The objective of this research was to prepare some strong acids for evaluation by Fort Belvoir as potential fuel cell electrolytes. The major acid, other than phosphoric, H3PO4, currently under investigation by Fort Belvoir as a fuel cell electrolyte is TFMSA, CF3SO3H.H2O, trifluoromethanesulfonic acid monohydrate aqueous solutions and sodium salt mixtures. TFMSA has been found to be superior to H3PO4 from the standpoint of electrode kinetics, but certain undesirable characteristics (volatility; wetting of Teflon) led to this research for a better fuel cell electrolyte.

AD-A078 876/0 PC A05/MF A01
Institute for Water Resources (Army) Fort Belvoir VA
Estimate of National Hydroelectric Power Potential at Existing Dams. Revision 2,
Richard J. McDonald. 20 Jul 77, 85p

The objectives of this study are threefold: (1) Estimate the maximum potential conventional hydropower capacity and electricity output which could be developed at existing dams in the United States; (2) Identify the constraints which might hinder or prevent the development of this potential; and (3) Identify the means which could be employed to resolve or relax these constraints and the incentives which might be used to spur the development of this potential. The report is organized into three chapters corresponding to the three objectives plus three appendices. Appendix A contains a detailed description of the method used by the Corps to estimate hydropower potential at existing small dams. Appendix B contains supplemental information on the hydropower potential for each of the 21 major drainage basins in the U.S., Alaska, Hawaii, Puerto Rico, and the Virgin Islands, including a summary of the engineering characteristics of the existing dams in each region. Appendix C contains regional statistics on current competing uses of existing reservoir storage space.

N80-14386/0 PC A04/MF A01
Rasor Associates, Inc., Sunnyvale, CA.
A Cesium Telec Experiment at Lewis Research Center.
Final Report.
E. J. Britt. Sep 79, 59p NASA-CR-159729, NSR-8-1
Contract NAS3-21149

The thermoelectronic laser energy converter (TELEC), was studied as a method of converting a 10.6 mm CO2 laser beam into electric power. The calculated characteristics of a TELEC seem to be well matched to the requirements of a spacecraft laser energy conversion system. The TELEC is a high power density plasma device which absorbs an intense laser beam by inverse bremsstrahlung with the plasma electrons. In the TELEC process, electromagnetic radiation is absorbed directly in the plasma electrons producing a high electron temperature. The energetic electrons diffuse out of the plasma striking two electrodes which are in contact with the plasma at the boundaries. These two electrodes have different areas: the larger one is designated as the collector, the smaller one is designated as the emitter. The smaller electrode functions as an electron emitter to provide continuity of the current. Waste heat is rejected from the collector electrode. An experiment was carried out with a high power laser using a cesium vapor TELEC cell with 30 cm active length. Laser supported plasma was produced in the TELEC device during a number of laser runs over a period of several days. Electric power from the TELEC was observed with currents in the range of several amperes and output potentials of less than 1 volt. The magnitudes of these electric outputs were smaller than anticipated but consistent with the power levels of the laser during this experiment.

N80-14405/8 PC A03/MF A01
Jet Propulsion Lab., Pasadena, CA.
Reactor for Simulation and Acceleration of Solar Ultraviolet Damage.
E. Laue, and A. Gupta. 21 Sep 79, 32p NASA-CR-162533, JPL-PUB-79-92
Contracts NAS7-100, JPL PROJ. 5101-35
Subm-Sponsored in Part by DOE.

An environmental test chamber providing acceleration of UV radiation and precise temperature control (+ or -)1 C was designed, constructed and tested. This chamber allows acceleration of solar ultraviolet up to 30 suns while maintaining temperature of the absorbing surface at 30 C - 60 C. This test chamber utilizes a filtered medium pressure mercury arc as the source of radiation, and a combination of selenium radiometer and silicon radiometer to monitor solar ultraviolet (295-340 nm) and total radiant power output, respectively. Details of design and construction and operational procedures are presented along with typical test data.

N80-14480/1 PC A11/MF A01
Power Electronics Associates, Inc., Lincoln, MA.
Bi-Directional Four Quadrant (BDQ4) Power Converter Development.
Final Report.
F. C. Schwarz. 20 Dec 79, 249p NASA-CR-159560
Contract NAS3-30363

The feasibility for implementation of a concept for direct ac/dc multikilowatt power conversion with bidirectional transfer of energy was investigated. A 10 kHz current carrier was derived directly from a common 60 Hz three phase power system. This carrier was modulated to remove the 360 Hz ripple, inherent in the three phase power supply and then demodulated and processed by a high frequency filter. The resulting dc power was then supplied to a load. The process was implemented without the use of low frequency transformers and filters. This power conversion processes was reversible and can operate in the four quadrants as viewed from any of the two of the converter's ports. Areas of application include: power systems on air and spacecraft; terrestrial traction; integration of solar and wind powered systems with utility networks; HVDC; asynchronous coupling of polyphase networks; heat treatment; industrial machine drives; and power supplies for any use including instrumentation.

N80-14481/9 PC A24/MF A01
Burt, Hill, Kosar, Rittleman, and Associates, Butler, PA.
Residential Photovoltaic Module and Array Requirements Study, Appendices.
Final Report.
S. L. Nearhoof, and J. R. Oster. Jun 79, 560p NASA-CR-162529, DOE/JPL-955149-79/1-APP
Contract JPL-955149
Subm-Sponsored by NASA Prepared for JPL and DOE.

Regional building code variations, federal and city codes, and the national electric code are reviewed for their possible effects on the design of photovoltaic modules. Problems that photovoltaic arrays may impose on the insurability of residences are also discussed. Mounting configurations are developed for the modules, and grounding, wiring, terminal, and voltage requirements are established. Installation and materials costs are presented along with performance criteria.

N80-14482/7 PC A04/MF A01
Burt, Hill, Kosar, Rittleman, and Associates, Butler, PA.
Residential Photovoltaic Module and Array Requirements Study.
Final Report.

S. L. Nearhoof, and J. R. Oster. Jun 79, 64p
NASA-CR-162528, DOE/JPL-955149-79/1
Contract JPL-955149
Subm-Prepared for JPL and DOE.

Design requirements for photovoltaic modules and arrays used in residential applications were identified. Building codes and referenced standards were reviewed for their applicability to residential photovoltaic array installations. Four installation types were identified - integral (replaces roofing), direct (mounted on top of roofing), stand-off (mounted away from roofing), and rack (for flat or low slope roofs, or ground mounted). Installation costs were developed for these mounting types as a function of panel/module size. Studies were performed to identify optimum module shapes and sizes and operating voltage cost drivers. It is concluded that there are no perceived major obstacles to the use of photovoltaic modules in residential arrays. However, there is no applicable building code category for residential photovoltaic modules and arrays and additional work with standards writing organizations is needed to develop residential module and array requirements.

N80-14483/5 PC **A04**/MF **A01**
Battelle Columbus Labs., OH.
Development of an Accelerated Test Design for Predicting the Service Life of the Solar Array at Mead, Nebraska.
Final Report.
G. B. Gaines, R. E. Thomas, G. T. Noel, T. S. Shilliday, and V. E. Wood. 7 Jun 79, 61p NASA-CR-162534, DOE/JPL-954328-79/13
Contract JPL-954328
Subm-Prepared for JPL and DOE.

An accelerated life test is described which was developed to predict the life of the 25 kW photovoltaic array installed near Mead, Nebraska. A quantitative model for accelerating testing using multiple environmental stresses was used to develop the test design. The model accounts for the effects of thermal stress by a relation of the Arrhenius form. This relation was then corrected for the effects of nonthermal environmental stresses, such as relative humidity, atmospheric pollutants, and ultraviolet radiation. The correction factors for the nonthermal stresses included temperature-dependent exponents to account for the effects of interactions between thermal and nonthermal stresses on the rate of degradation of power output. The test conditions, measurements, and data analyses for the accelerated tests are presented. Constant-temperature, cyclic-temperature, and UV types of tests are specified, incorporating selected levels of relative humidity and chemical contamination and an imposed forward-bias current and static electric field.

N80-14484/3 PC **A08**/MF **01E**
General Electric Co., Cincinnati, OH.
A Conceptual Design Study on the Application of Liquid Metal Heat Transfer Technology to the Solar Thermal Power Plant.
Final Report.
W. F. Zimmerman, C. S. Robertson, C. L. Ehde, S. M. Divakaruni, and L. E. Stacy. 25 Sep 79, 166p NASA-CR-162544, DOE/JPL-1060/28
Contract JPL-955018
Subm-Sponsored by NASA Prepared for JPL and DOE.

Alkali metal heat transfer technology was used in the development of conceptual designs for the transport and storage of sensible and latent heat thermal energy in distributed concentrator, solar Stirling power conversion systems at a power level of 15 kWe per unit. Both liquid metal pumped loop and heat pipe thermal transport were considered; system configurations included: (1) an integrated, focal mounted sodium heat pipe solar receiver (HPSR) with latent heat thermal energy storage; (2) a liquid sodium pumped loop with the latent heat storage, Stirling engine-generator, pump and valves located on the back side of the concentrator; and (3) similar pumped loops serving several concentrators with more centralized power conversion and storage. The focus mounted HPSR was most efficient, lightest and lowest in estimated cost. Design confirmation testing indicated satisfactory performance at all angles of inclination of the primary heat pipes to be used in the solar receiver.

N80-14486/8 PC **A06**/MF **A01**
Springborn Labs., Inc., Enfield, CT.
Investigation of Test Methods, Material Properties, and Processes for Solar Cell Encapsulants.
Annual Report.
P. B. Willis, and B. Baum. Jun 79, 122p NASA-CR-162542, DOE/JPL-954527-79/10
Contracts NAS7-100, JPL-954527
Subm-Prepared for DOE and JPL.

The reformulation of a commercial grade of ethylene/vinyl acetate copolymer for use as a pottant in solar cell module manufacture was investigated. Potentially successful formulations were prepared by compounding the raw polymer with antioxidants, ultraviolet absorbers and crosslinking agents to yield stabilized and curable compositions. The resulting elastomer was found to offer low cost (approximately $0.80/lb.), low temperature processability, high transparency (91% transmission), and low modulus. Cured specimens of the final formulation endured 4000 hours of fluorescent sunlamp radiation without change which indicates excellent stability.

N80-14487/6 PC **A04**/MF **A01**
Purdue Univ., Lafayette, IN.
Analysis and Simulation of Wind Energy Systems.
Final Report.
P. C. Krause. Nov 79, 60p NASA-CR-162538
Grant NSG-3237

Using a wind fluctuation model, simulation results of the mechanical and electrical systems were obtained for the MOD-2 wind turbine generator system. The dynamic performance of the MOD-2 was studied during wind gusts of the 1-cos form from a constant wind velocity. If these are the type of wind fluctuations to which the wind systems will be subjected to, then the design of the MOD-2 appears adequate. There was one exception to this; with a rate limit incorporated in the pitch controller, an instability occurred during a 'down' gust which caused continuous, unbounded switching between the high and low modes. This is a control design problem which appears to be correctable.

N80-14488/4 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Application of Field-Modulated Generator Systems to Dispersed Solar Thermal Electric Generation.
R. Ramakumar. 15 Aug 79, 94p NASA-CR-162536, JPL-PUB-79-83
Contracts NAS7-100, JPL PROJ. 5102-136
Subm-Sponsored in Part by DOE.

The state-of-the-art of field modulated generation system (FMGS) is presented, and the application of FMGS to dispersed solar thermal electric generation is discussed. The control and monitoring requirements for solar generation system are defined. A comparison is presented between the FMGS approach and other options and the technological development needs are discussed.

N80-14489/2 PC **A02**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Environmental Testing of Block 3 Solar Cell Modules. Part 1: Qualification Testing of Standard Production Modules.
J. S. Griffith. 1 Sep 79, 21p NASA-CR-162547, JPL-PUB-79-96
Contract NAS7-100
Subm-Sponsored in Part by DOE.

Qualification tests of solar cell modules are described. These modules continue to show improvement over earlier type modules tested. Cell cracking and delamination are less prevalent, and interconnect problems and electrical degradation from environmental testing are now rare.

N80-14490/0 PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Fracture Strength of Silicon Solar Cells.
C. P. Chen. 15 Oct 80, 69p NASA-CR-162540, DOE/JPL-1012-32
Contracts NAS7-100, EX-76-A-29-1012

A test program was developed to determine the nature and source of the flaw controlling the fracture of silicon solar cells and to provide information regarding the mechanical strength of cells. Significant changes in fracture strengths were found in seven selected in-process wafer-to-cell products from a manufacturer's production line. The fracture strength data were statistically analyzed and interpreted in light of the exterior flaw distribution of the samples.

N80-14491/8 PC **A06**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Solar Thermal Power Systems Advanced Solar Thermal Technology Project, Advanced Subsystems Development.
Semiannual Progress Report, 1 Oct. 1978 - 1 Apr. 1979.
15 Aug 79, 110p NASA-CR-162546, DOE/JPL-1060-20
Contracts NAS7-100, DE-AI01-79ET-20307
Misc-Original Contains Color Illustrations.

The preliminary design for a prototype small (20 kWe) solar thermal electric generating unit was completed, consisting of several subsystems. The concentrator and the receiver collect solar energy and a thermal buffer storage with a transport system is used to provide a partially smoothed heat input to the Stirling engine. A fossil-fuel combustor is included in the receiver designs to permit operation with partial or no solar insolation (hybrid). The engine converts the heat input into mechanical action that powers a generator. To obtain electric power on a large scale, multiple solar modules will be required to operate in parallel. The small solar electric power plant used as a baseline design will provide electricity at remote sites and small communities.

N80-14493/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Status of the Doe/NASA Critical Gas Turbine Research and Technology Project.
J. S. Clark. 1980, 21p NASA-TM-79307, DOE/NASA/2593-79/11
Contract EF-77-A-01-2593
Conf-Proposed for Presentation the 25TH Annual Gas Turbine Conf., New Orleans, 9-13 Mar. 1980; Sponsored by the AM. Soc. Of Mech. Engineers.

Activities performed in order to provide an R&T data base for utility gas turbine systems burning coal-derived fuels are described. Experiments were run to determine the corrosivity effects of trace metal contaminants (and potential fuel additives) on gas turbine materials and these results were correlated in a corrosion-life prediction model. Actual fuels were burned in a burner rig hot corrosion test to verify the model. A deposition prediction model was assembled and compared with results of actual coal-derived fuel deposition tests. Thermal barrier coatings were tested to determine their potential for protecting gas turbine hardware from the corrosive contaminants. Several coatings were identified with significantly improved spallation-resistance (and, hence, corrosion resistance).

PAT-APPL-6-093 714 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Pasadena Office, CA.
Schottky Barrier Solar Cell and Method of Fabrication.
Patent Application.
R. J. Stirn, and Y. C. M. Yeh. Filed 13 Nov 79, 33p N80-12549/5, NASA-CASE-NPO-13689-2
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A Schottky barrier solar cell is described which consists of a thin substrate of low cost material with at least the top surface of the substrate being electrically conductive. A thin layer of heavily doped n-type polycrystalline germanium, with crystalline sizes in the submicron range, is deposited on the substrate after a passivation layer is deposited on the substrate to prevent migration of impurities into the polycrystalline germanium on a substrate of low-cost conductive material. Then, the polycrystalline germanium is recrystallized to increase the crystal sizes in the germanium layer to not less than 5 microns, and preferably considerably more. It serves as a base layer on which a thin layer of gallium arsenide is vapor-epitaxially grown

to a selected thickness. Then, a thermally-grown oxide layer of a thickness of several tens of angstroms is formed on the gallium arsenide layer.

PB80-121403 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Properties of Molten Coal Slags Relating to Open Cycle MHD.
Final progress rept.,
J. Lambert Bates. Dec 75, 54p BNWL-B-466, NSF/RA/N-75/466
Grant NSF-GI-44100

Magnetohydrodynamic (MHD) power generators are being proposed for increasing the use and efficiency of coal for base-load generation of electric power. The mineral ash produced can either be beneficial or deleterious to the performance of the MHD system depending upon the physical state of the ash and its properties. This study investigates the thermal diffusivity, electrical conductivity, viscosity, and surface tension of molten coal slags containing potassium seed, which is added to the combustor to increase electrical conductivity. These properties are examined as a function of composition, seed concentration, and temperature. The effects of potassium seed additions, an intercorrelation between properties and composition, and the equilibrium solubility of potassium slags are included. Experimental techniques, results, and discussions are presented for each property investigated.

PB80-127343 PC **A03**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Electrical Engineering.
Silicon Schottky Photovoltaic Diodes for Solar Energy Conversion.
Quarterly progress rept. 1 Apr-30 Jun 77,
Wayne A. Anderson. Jul 77, 28p NSF/RANN/SE/AER73-03197/PR/77/2, NSF/RA-770879
Grant NSF-AER73-03197
See also Quarterly progress rept. dated May 77, PB-268 457.

Research involved in increasing the efficiency of the Schottky solar cell is presented. Fabrication studies employed different Schottky metals and new antireflection (A/R) coatings to improve circuit current density (J(sc)). Results previously obtained with several Schottky metals are compared to recent data on titanium. The higher J(sc) of titanium is due to its better optical transmission characteristics but is insufficient to offset lowered open circuit voltage. Ellipsometry and Auger studies were conducted to more fully characterize the thin oxide layer between Schottky metal and silicon. New cerium and antimony oxide A/R coatings produced 5-10 percent improvement in J(sc). The refractive index of these coatings was obtained by measuring oscillations in transmission on glass slides. Solar cell analysis was extended to include ellipsometry studies of thin oxide films on silicon which determine the oxide thickness. Surface state and lock-in-amplifier measurements were performed to establish surface state distribution in the energy gap. Environmental studies show that the polystyrene encapsulant offers better degradation protection than the Sylgard 184 for Schottky cells.

PB80-802697 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Solar Power Satellites (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Nov 79,
Gerald F. Zollars. Dec 79, 88p
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography of citations to the international literature concerns the development of solar power satellites. The design and construction of the satellite solar arrays and the technology of satellite solar energy conversion and transmission to earth are the major topics covered. Feasibility Analyses of the solar power satellite concept are also included. (Contains 320 citations)

10C. Energy Storage

AD-A078 646/7 PC **A02**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
Characterization Measurements on New Nickel/Cadmium Aircraft Batteries Manufactured by Marathon and Saft.
Technical note,
Keiva Feldman, and Gaston Verville. Oct 79, 18p
Rept no. DREO-TN-79-22

A set of measurements has been found useful in the laboratory at DREO for characterizing nickel/cadmium aircraft cells. It is thought such measurements would also be useful in the battery shop to aid in the making of decisions on the need for reconditioning or for discarding cells which are no longer safe or satisfactory. Most of the experience at DREO has, however, dealt with old or rebuilt batteries. Recently one new 22Ah battery from Marathon and two new 36Ah batteries from SAFT were obtained. Results of the measurements on these are therefore of special interest. This paper briefly outlines the measurements and presents the data obtained. (Author)

AD-A078 697/0 PC **A03**/MF **A01**
Naval Surface Weapons Center White Oak Lab Silver Spring MD
Aromatic Ions as Anode Materials for Rechargeable, Ambient - Temperature Batteries.
Final rept.,
Stanley D. James. 22 Mar 79, 28p Rept no. NSWC/TR-79-275

The use of aromatic radical ions is proposed as anode material for high energy density, ambient-temperature, secondary batteries. Preliminary data are promising, showing that the naphthalenide anion can provide high current-densities at practical current-collectors like steel and nickel. However, the present test-electrode design did not confine naphthalene long enough to demonstrate rechargeability over a number of cycles. Two approaches are recommended to containing the aromatics close to a current-collector for extended periods of charge-discharge cycling. (Author)

AD-A078 714/3 PC **A04**/MF **A01**
Eagle-Picher Industries Inc Colorado Springs CO
High Rate Stable Nickel-Cadmium Batteries.
Final rept. Jun 75-May 79,
James M. Hill. Aug 79, 67p DELET-TR-75-1770-F
Contract DAAB07-75-C-1770

The report describes work for the design, construction, and testing of advanced state-of-the-art high rate stable vented nickel-cadmium batteries, with a special emphasis on the improvement of the separator wrap. Eagle-Picher Industries, Inc. designed and tested three to five cell units (BB-600 cells) of the BB-433 aircraft battery during phase I of this contract for the purpose of determining and selecting an optimum design. Phase II, the second half of the contract, included the design, fabrication and testing of 24 volt, 35 ampere-hour batteries of the BB-433 configuration, utilizing the optimum design features of Phase I. The batteries and the three to five cell units were tested in accordance with the updated Technical Guidelines for High Rate Stable Nickel-Cadmium Batteries.

AD-A078 961/0 PC **A06**/MF **A01**
Honeywell Power Sources Center Horsham PA
Safety Studies of Lithium-Sulfur Dioxide Cells.
Final rept. 25 Apr-27 Oct 78,
L. J. Blagdon, and B. Randall. Nov 79, 117p DELET-TR-78-0530-F
Contract DAAB07-78-C-0530

Hermetically sealed sulfur dioxide 'D' cells were fabricated and tested to improve safety during use/abuse conditions. Cathodes and anodes were optimized to yield efficient and safe operation at -20 F. Explosions were eliminated and venting was minimized when the cells were discharged at 2A constant current to 200% of the theoretical SO2 content between -20 F and +130 F. Discharge currents at 3.5A and above resulted in frequent but safe venting.

PATENT-4 177 328 Not available NTIS
Department of the Air Force Washington DC
Wall Wick for Nickel-Hydrogen Cell.
Patent,
Howard H. Rogers. Filed 19 Dec 78, patented 4 Dec 79, 5p AD-D006 801/5, PAT-APPL-970 910
Supersedes PAT-APPL-970 910-78, AD-D005 944.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Electrolyte, lost from the stack to the case in a sealed electrochemical cell, is returned to the stack by a zironium oxide based ceramic deposited on the inside wall of the pressure vessel, wicking by capillary action, the electrolyte from regions external to the stack to the stack components. The ceramic wick is also used to transfer electrolyte from one separator and/or reservoir to another within the stack, replacing an interior stack wick in a recirculating design. The wall wick is also effective in a back-to-back type cell design. (Author)

PATENT-4 179 799 Not available NTIS
Department of the Air Force Washington DC
Method of Molding a Double Cathode Having a Sensing Grid for a Porous Electrode Primary Battery.
Patent,
David H. Fritts. Filed 17 Apr 78, patented 25 Dec 79, 6p AD-D006 791/8, PAT-APPL-896 863
Supersedes PAT-APPL-896 863-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In a porous electrode primary battery a sensing grid is positioned in a cell on or near the surface of the porous cathode facing the separator and anode. The voltage measured between this sensing grid and the conventional cathode current collector grid is a function of the current distribution within the electrode which is continuously changing as the battery discharges, thus the measured voltage is indicative of the state of charge of the particular cell having the sensing grid and for a battery containing cooperatively connected cells, the state of the battery in general. (Author)

11. MATERIALS

11A. Adhesives and Seals

AD-A078 953/7 PC **A03**/MF **A01**
Dayton Univ OH Research Inst
Environmental Durability Testing of Structural Adhesives. Part III. Rellabond 500/Rellabond 398.
Interim technical rept. Jun-Dec 78,
D. Robert Askins. Nov 79, 32p UDR-TR-79-24, AFML-TR-78-35-PT-3
Contract F33615-78-C-5002

A program has been conducted to investigate the durability of a 350 F (121 C) curing modified epoxy structural adhesive in an elevated temperature, high humidity environment while under stress. Durability was assessed with three different types of environmental exposure. Unstressed lap shear specimens were exposed to both a 140 F (60 C)/95-100% R.H. environment and a 140 F (60 C) water soak and residual strength tests were conducted after various aging intervals. Stressed lap shear specimens were exposed to a 140 F (60 C)/95-100% R.H. environment and time-to-failure recorded. The unstressed agings produced a progressive loss of residual strength and a progressive increase in the amount of adhesive (interfacial) failure with increased aging time. The stressed agings produced times-to-failure at least as long as those previously obtained (AFML-TR-78-35, Part I) for the PL-729-3/PL-728 and AF-143-2/EC-3917 adhesive/primer systems on the same substrates and surface preparations. Had exposure times been extended beyond 2400 hours, the R398/R500 system may have proven more durable than the two previously tested systems. (Author)

N80-14122/9 PC **A06**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
Feasibility of SIC Composite Structures for 1644 K (2500 F) Gas Turbine Seal Application.
Final Report, 28 Apr. - 30 May 1979.
R. Darolia. Nov 79, 120p NASA-CR-159597, R79AEG625
Contract NAS3-20082

The silicon carbide composites evaluated consisted of Si/SiC and sintered silicon carbide as substrates, both with attached surface layers containing BN as an additive. A total of twenty-eight candidates with variations in substrate type and density, and layer chemistry, density, microstructure, and thickness were evaluated for abradability, cold particle erosion resistance, static oxidation resistance, ballistic impact resistance, and fabricability. BN-free layers with variations in density and pore size were later added for evaluation. The most promising candidates were evaluated for Mach 1.0 gas oxidation/erosion resistance from 1477 K (2200 F) to 1644 K (2500 F). The as-fabricated rub layers did not perform satisfactorily in the gas oxidation/erosion tests. However, preoxidation was found to be beneficial in improving the hot gas erosion resistance. Overall, the laboratory and rig test evaluations show that material properties are suitable for 1477 K (2200 F) gas turbine seal applications. Further improvements are needed in hot gas erosion resistance and abradability to demonstrate feasibility to 1644 K (250 F).

N80-14235/9 PC **A09**/MF **A01**
AiResearch Mfg. Co., of Arizona, Phoenix.
Abradable Compressor and Turbine Seals, Volume 1.
D. V. Sundberg, R. E. Dennis, and L. G. Hurst.
May 79, 178p NASA-CR-159600, AIRESEARCH-21-3213-1
Contract NAS3-20073

The application and advantages of abradable coatings as gas-path seals in a general aviation turbine engine were evaluated for use on the high-pressure compressor, the high-pressure turbine, and the low-pressure turbine shrouds. Topics covered include: (1) the initial selection of candidate materials for interim full-scale engine testing; (2) interim engine testing of the initially selected materials and additional candidate materials; (3) the design of the component required to adapt the hardware to permit full-scale engine testing of the most promising materials; (4) finalization of the fabrication methods used in the manufacture of engine test hardware; and (5) the manufacture of the hardware necessary to support the final full-scale engine tests.

N80-14403/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Self-Acting Lift-Pad Geometry for Circumferential Seals: A Noncontacting Concept.
G. P. Allen. Jan 80, 11p NASA-TP-1583, E-154

A segmented circumferential seal with lift pads for hydrodynamic action was analyzed over ranges of speed and sealed pressure. Performance predictions, which predicted noncontact operation for speeds as high as 600 revolutions per second at sealed pressures to 86 N/sq cm, are discussed. Performance tests were performed on the seals and compared with the performance predictions.

PAT-APPL-6-070 473 PC **A02**/MF **A01**
Department of the Air Force Washington DC
F-Phenylalkylene Oxide Diacetylenes.
Patent Application,
Keith B. Baucom. Filed 28 Aug 79, 14p AD-D006 763/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A need exists for monomers for use in the preparation of polymeric materials that will fulfill requirements for dynamic seal applications, e.g., O-rings, gaskets, diaphragms, and the like, as well as sealant applications, e.g., fuel tank sealants, coatings, and the like. Such polymers should have good thermal, oxidative, and chemical stability as well as excellent low temperature properties. Elastomers based upon perfluorinated polyethers have been considered to be likely candidates achieving the desired goal. However, up to the present time, it appears that only low molecular weight perfluorinated polyethers with little elastomeric character have been prepared. No widely accepted theorectical polymerization scheme is known that would lead to pure perfluorinated polyether elastomers. The present day approach to this problem is to prepare perfluorinated polyether prepolymers which can be used to prepare curable high molecular weight polymers. It is essential that the connecting group between the polyether segments have the thermal, oxidative and chemical properties demanded of the basic elastomer. The ideal basic polymer would be composed of -CF2CF20- repeating units connected by benzene rings.

PAT-APPL-6-092 145 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Modified Face Seal for Positive Film Stiffness.
Patent Application,
I. Etsion, and A. Lipshitz. Filed 7 Nov 79, 7p
N80-12414/2, NASA-CASE-LEW-12989-1
Subm-Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An invention to improve the film stiffness of a face seal without increasing the sealing and dam area is described. The improved sealing apparatus has a primary seal ring in the form of a nose piece. A spring forces a sealing surface on the seal ring into sealing contact with a seat to form a face seal. A circumferential clearance seal is formed in series with this face by a lip on the nose piece. The width of the surface of the lip is substantially the same as the width of the sealing surface on the face seal. Also, the clearance between the surface on the lip and the shaft is substantially the same as the spacing between the face sealing surfaces on the face seal when the shaft is rotating. The circumferential clearance seal restricts the flow of fluid from a main cavity to an intermediate cavity with a resulting pressure drop. The hydrostatic opening is strongly dependent on the face seal clearance, and the desired axial stiffness is achieved.

PATENT-4 174 843 Not available NTIS
Department of the Navy Washington DC
Self-Adjusting Tandem Seal.
Patent,
John P. Arena, Charles G. McGuigan, and Gene A. Rossi. Filed 8 Jun 78, patented 20 Nov 79, 4p AD-D006 775/1, PAT-APPL-913 935
Supersedes PAT-APPL-913 935-78, AD-D005 305.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A dynamic seal has a primary and secondary seal ring connected in series between first and second fluid zones, with an intermediate fluid zone between the seal rings. When leakage occurs between the first and intermediate zones, the pressure in the intermediate zone builds up through a feedback system increasing the force on the primary seal rings. Furthermore, leakage through the primary seal also takes place creating another force that also provides a tighter seal. In addition, the primary and secondary seal rings have additional variable and feedback controls for adjusting the force on the dynamic seal. (Author)

PATENT-4 177 308 Not available NTIS
Department of the Air Force Washington DC
Non-Combustible High Temperature Abradable Seal Material.
Patent,
David R. Beeler. Filed 10 Aug 78, patented 4 Dec 79, 3p AD-D006 802/3, PAT-APPL-932 814
Supersedes PAT-APPL-932 814-78, AD-D005 289.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A non-combustible, abradable sealant composition for jet engines comprising a major amount of aluminum phosphate and a minor amount of silica or glass microspheres. (Author)

11B. Ceramics, Refractories, and Glasses

AD-A078 540/2 PC **A07**/MF **A01**
Montana Energy and Mhd Research and Development Inst Butte
Thermal Conductivity and Diffusivity of Engineering Ceramics.
Final technical rept. 15 Sep 78-14 Sep 79,
G. E. Youngblood, and Larry D. Bentsen. 15 Nov 79, 139p Rept no. 4TC-NAVY-F/79
Contract N00014-78-C-0726
See also AD-A045 527.

This report summarizes the results of a one-year research program devoted to an investigation of the effect of compositional and microstructural variables on the thermal conductivity/diffusivity of engineering ceramics. Particular emphasis was placed on studies of thermal transport phenomena in composite materials. A total of six completed studies have resulted during this program, with another four in progress, as follows: (1) Effect of Crystallization on the Thermal Diffusivity of a Cordierite Glass-Ceramic. (2) Thermal Diffusivity of Ba/Mica/Alumina Composites. (3) Thermal Diffusivity of Al2O3 with Dispersed Monoclinic and Tetragonal ZrO2 particles. (4) Effect of thermal Expansion Mismatch on the Thermal Diffusivity of Glass-Ni Composites. (5) Simple Laser Pulse Calorimeter. (6) Thermal Diffusivity/Conductivity of Dense Magnesia/Magnesia-Alumina Spinel Ceramic. (7) Thermal Diffusivity of Al2O3/SiC Composites. (8) Thermal Diffusivity of MgO/SiC Composites. (9) Thermal Diffusivity of Al2O3/TiC Composites. (10) Thermal Diffusivity of a Partially Electronic Conducting Ceramic: Yttrium Chromites. (Author)

AD-A078 833/1 PC **A02**/MF **A01**
Sri International Menlo Park CA
Improved Impact Fracture Resistance in Oxidation-Toughened Si3N4-20 Vol% ZrO2.
Technical rept. 2 Feb 79-1 Feb 80,
D. A. Shockey, and K. C. Dao. Dec 79, 19p
Contract N00014-76-C-0657

Dr. F. F. Lange is using an oxidation technique to induce compressive stresses in the near-surface regions of Si3N4-ZrO2 specimens. Silicon nitride powder is first thoroughly mixed with about 20 vol% zirconium oxide and 4 vol% Al2O3 powders, then hot pressed to achieve a fully dense plate. The plate is then given a subsequent anneal at 700 C for 5 hr in air. The zirconium oxynitride within several grain diameters of the surfaces is oxidized to the monoclinic form with an accompanying increase in molar volume of about 4-5%. The expansion of the lattice in the surface regions gives rise to substantial compressive stresses on the surface (and significant tensile stresses in the interior).

AD-A078 839/8 PC **A04**/MF **A01**
California Univ Berkeley Dept of Materials Science and Engineering
Elastic/Plastic Identation Damage in Ceramics. I. The Median/Radial Crack System. Part II. A Study of Kink Band Formation in Composites.
Rept. for 1 Jan-1 Dec 79,
B. R. Lawn, A. G. Evans, D. B. Marshall, and C. H. Hseuh. 1 Dec 79, 63p
Contract N00014-79-C-0159

A theory for describing the evolution of the median/radial crack system in the far field of sharp-indenter contacts is developed. Analysis is based on a model in which the complex elastic/plastic field beneath the indenter is resolved into elastic and residual components. The elastic component, being reversible, assumes a secondary role in the fracture process: although it does enhance downward (median) extension during the loading half-cycle, it suppresses surface (radial) extension to the extent that significant growth continues during unloading. The residual component accordingly provides the primary driving force for the crack configuration in the final stages of evolution, where the crack tends to near-half-penny geometry. On the hypothesis that the origin of the irreversible field lies in the accommodation of an expanding plastic hardness impression by the surrounding elastic matrix, the ensuing fracture mechanics relations for equilibrium crack growth are found to involve the ratio hardness-to-modulus as well as toughness. observations of crack evolution in soda-lime glass provide a suitable calibration of indentation coefficients in these relations.

N80-14485/0 PC **A04**/MF **A01**
Coors Porcelain Co., Golden, CO.
Development of Mullite Substrates and Containers.
Final Report, 7 Oct. 1977 - 15 Apr. 1979.
J. D. Sibold. 20 Apr 79, 55p NASA-CR-162543, DOE/JPL-954878-79/5

Contract JPL-954878
Subm-Sponsored by NASA Prepared for JPL and DOE.

The mullite-molten silicon interaction was evaluated through fabrication of a series of bodies made with variations in density, alumina-silica ratio, and glass-crystalline ratio. The materials were tested in a sessile drop technique. None of the variations stood up to extended exposure to molten silicon sufficiently to be recommended as a container material. However, directional solidification experiments suggest that, under proper conditions, contamination of the silicon by mullite containers can be minimized. To improve an already good thermal expansion match between mullite and silicon, compositional variations were studied. Altering of the alumina-silica ratio was determined to give a continuously varying thermal expansion. A standard mullite composition was selected and substrates 40 x 4 x .040 inches were fabricated. Slotted substrates of various configurations and various compositions were also fabricated.

PB80-122773 PC **A02**/MF **A01**
Bureau of Mines, University, AL. Tuscaloosa Metallurgy Research Center.
Relationship of Mineralogical and Chemical Composition of Refractory Periclases to Modulus of Rupture at 1,500 to 1,600C.
Rept. of investigations,
J. T. McLendon, N. S. Raymon, and H. Heystek. 1979, 24p BUMINES-RI-8386

As part of its research project in developing improved refractory materials for metallurgical applications, the Federal Bureau of Mines obtained hot modulus of rupture data at 1,500, 1,550, and 1,600 C on samples of 13 refractory periclase materials produced from seawater, lake brines, and natural magnesite. The periclase samples also were characterized to establish chemical and mineralogical composition and microstructure. The results indicated that a high MgO content does not necessarily assure good hot strength and that an optimum and varying CaO-SiO2 ratio exists for each individual periclase sample.

PB80-125685 PC **A04**/MF **A01**
Appropriate Technology Development Association, Lucknow (India).
Appropriate Technology for Manufacture of Whiteware Pottery on Cottage Basis in Rural Areas.
Project report and feasibility study series no. 3,
M. K. Garg, and Rajinder Singh. 27 Jun 79, 59p
Sponsored in part by Agency for International Development, Washington, DC.

The publication reflects an appropriate technology for the Indian village potter through a combination of product-selection, technology and organizational pattern. With help from this publication, interested organizations in India and other developing countries can set up a whole infrastructure including service center, production unit and marketing organization so that the village potters can manufacture whiteware pottery in their own homes or in cottages in villages and earn a reasonable living thereby.

PB80-804271 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Aluminum Oxides (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Nov 79,
Gerald F. Zollars, and William R. Bozman. Feb 80, 65p
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography of citations to the international literature concerns studies of the properties of aluminum oxides. Topics covered are mechanical properties, fracture strength, microstructure, and high temperature tests. (Contains 285 citations)

PB80-804289 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Silicon Nitrides (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Nov 79,
Gerald F. Zollars, and William R. Bozman. Feb 80, 83p
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography of citations to the international literature concerns studies of the properties of silicon nitrides. Topics covered are mechanical properties, microstructure, fracture strength, reaction kinetics, crack propagation, and high temperature tests of silicon nitrides. Applications of silicon nitrides in gas turbines and as a radome material are included. (Contains 339 citations)

11C. Coating, Colorants, and Finishes

N80-14248/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Procedure for the Formation of a Coating on an Object by Polymerization by Luminescent Discharge.
Dec 79, 11p NASA-TM-75926
Contract NASW-3199
Tran-Transl. Into English of French Patent No. 1.488.513 (File No. 70.723, 25 Jul. 1966) 5 p. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The object to be coated was placed in a reaction area located in a luminescent discharge chamber. By introducing the polymerizable material in this reaction area and applying an electrical field to this reaction, a polymerized film was obtained on the coating object under controlled conditions. By the use of thermomechanical treatment on the object, the undesirable effects of discoloration, brittleness, and viscosity can be controlled.

N80-14249/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Friction and Wear of Plasma-Sprayed Coatings Containing Cobalt Alloys from 25 Deg to 650 Deg in Air.
H. E. Sliney, and T. P. Jacobson. 1979, 20p
NASA-TM-79316, E-189

Four different compositions of self-lubricating, plasma-sprayed, composite coatings with calcium fluoride dispersed throughout cobalt alloy-silver matrices were evaluated on a friction and wear apparatus. In addition, coatings of the cobalt alloys alone and one coating with a nickel alloy-silver matrix were evaluated for comparison. The wear specimens consisted of two, diametrically opposed, flat rub shoes sliding on the coated, cylindrical surface of a rotating disk. Two of the cobalt composite coatings gave a friction coefficient of about 0.25 and low wear at room temperature, 400 and 650 C. Wear rates were lower than those of the cobalt alloys alone or the nickel alloy composite coating. However, oxidation limited the maximum useful temperature of the cobalt composite coating to about 650 C compared to about 900 C for the nickel composite coating.

PATENT-4 130 466 Not available NTIS
Department of the Navy Washington DC
Antifouling Coating for Aluminum Structures.
Patent,
Irvin R. Kramer. Filed 31 May 78, patented 19 Dec 78, 3p AD-D006 786/8, PAT-APPL-911 267
Supersedes PAT-APPL-911 267-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Aluminum objects which are designed to be submersed, submerged, or buried are rendered antifouling by anodizing the surface of the aluminum and impregnating therein, for example, an organometallic compound containing tin. Long term antifouling is achieved due to the low rate of leaching of the organotin compound, while adverse environmental effects are minimized. (Author)

PATENT-4 157 991 Not available NTIS
Department of the Navy Washington DC
Corrosion Preventive Composition.
Patent,
Gabriel J. Pilla. Filed 10 Apr 78, patented 12 Jun 79, 4p AD-D006 783/5, PAT-APPL-894 771
Supersedes PAT-APPL-894 771-78, AD-D005 298.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A coating composition for protecting metal surfaces from corrosion having controlled proportions of an alkyl ammonium alkyl phosphate and a high molecular weight petroleum sulfonate to inhibit corrosion, silicone and silicone alkyd resins to provide a physical barrier, trichlorotrifluoroethane and an aromatic hydrocarbon as solvents, and isopropyl alcohol as a coupling agent. An ethyl cellulose thickener may be added to the composition to increase its viscosity and reduce vertical run-off of the coating. The composition displaces water and moisture on the surface to be coated and deposits a clear, flexible, non-tacky film particularly resistant to abrasion. (Author)

PATENT-4 174 329 Not available NTIS
Department of Agriculture, Washington, DC.
Alkyd Resins Modified with Tetrafluoroethylene Adduct of Conjugated Triglycerides.
Patent,
Edward W. Bell, and Lyle E. Gast. Filed 26 Jun 78, patented 13 Nov 79, 5p PB80-130602, PAT-APPL-918 892
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Cycloaddition reaction products of tetrafluoroethylene and conjugated triglyceride oils have been prepared and used in the modification of alkyd resins. Clear exterior coatings formulated from these resins are characterized by superior durability properties, including resistance to checking, cracking, flaking, and erosion.

PB80-804594 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plasma and Flame Sprayed Coatings (Citations from the NTIS Data Base).
Rept. for 1964-Jan 80,
William E. Reed. Feb 80, 306p
Supersedes NTIS/PS-79/0054, NTIS/PS-78/0078, and NTIS/PS-77/0077. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-76/0048, and PB80-804602.

Aspects of plasma and flame spraying are cited in these Federally-funded research reports. The applications, techniques, and theory are covered for various types of coatings including metals and ceramics. Also cited are reports on the resulting coatings and their properties as the result of these techniques. (This updated bibliography contains 299 abstracts, 27 of which are new entries to the previous edition.)

PB80-804602 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plasma and Flame Sprayed Coatings. Volume 2. 1974-1979 (Citations from the Engineering Index Data Base).
Rept. for 1974-79,
William E. Reed. Feb 80, 397p
Supersedes NTIS/PS-79/0055, NTIS/PS-78/0079, and NTIS/PS-77/0078. For the companion Published Search of the NTIS Data Base, see PB80-804594. See also Volume 1, 1970-1973, NTIS/PS-76/0048.

Worldwide research on plasma and flame sprayed coatings is covered in this bibliography. Metal and ceramic coatings are described. Coating techniques, applications, and theory are cited. (This updated bibliography contains 390 abstracts, 90 of which are new entries to the previous edition.)

11D. Composite Materials

AD-A078 370/4 PC **A03**/MF **A01**
Cornell Univ Ithaca NY Dept of Theoretical and Applied Mechanics
Ultrasonic Nondestructive Testing of Materials.
Annual rept. 1 Aug 78-31 Jul 79,

Yih-Hsing Pao, and Wolfgang Sachse. 15 Oct 79, 31p AFOSR-TR-79-1174
Contract F49620-78-C-0100

The method of phase spectroscopy was applied to measure dispersions of longitudinal and transverse waves in graphite-epoxy and boron-epoxy composite materials over a wide frequency range. A method to determine the attenuation from the dispersion based on the Kramers-Kronig relations was developed. To separate the attenuation due to scattering, and that due to viscosity, dispersion and attenuation of waves in a laminated viscoelastic composite material was analyzed using a statistical theory of multiple scattering. (Author)

AD-A078 429/8 PC **A03**/MF **A01**
Connecticut Univ Storrs Dept of Mechanical Engineering
Wear of Homogeneous and Composite Materials under Conditions of Repeated Normal and Sliding Impact.
Final rept. 30 Jun 76-31 Aug 79,
Stephen Rice, and Roman Solecki. 1979, 36p AFOSR-TR-79-1241
Grant AFOSR-76-3087

This report describes experimental and analytical investigations in the area of wear of materials under repetitive compound impact. A reciprocating apparatus which provides controlled, repeatable, measureable impulsive loads between specimen and counterface has been employed in wear testing. Specimen materials in previous experimentation include polymers, composites, and several alloys. That reported herein focusses upon titanium alloys, metallic composites, and copper-chromium alloys. The formation of subsurface zones occurring in impact wear appears to be significant. Correlations between subsurface strain gradients and wear have been demonstrated. These subsurface plastic deformations are dependent upon macroscopic 'solid contact' conditions imposed during impact. Temperatures occasioned at and near the wear interface are shown locally to each levels of 800C for test conditions explored. Void and crack formation in the substrate is occasionally observed, but not nearly to the extent reported for materials under conditions of sliding wear. Analytical investigations are directed toward determination of the states of stress in material specimens undergoing controlled repetitive impact. Results are derived from the equations of the linear theory of elasticity applied to a finite cylinder impacting a rough, rigid surface.

AD-A078 466/0 PC **A02**/MF **A01**
New York Univ NY
Effective Behavior of Composite Materials.
Final rept. 1 Aug 78-31 Jul 79,
George C. Papanicolaou. Jul 79, 7p AFOSR-TR-79-1157
Grant AFOSR-78-3668

The following four problems have been analyzed in detail. First, the effective heat removal rate for a conducting material perforated with many small holes is computed. Second, for a conducting material impregnated with nonconductors occupying a large fraction of the medium and randomly dispersed the effective conductivity is obtained. Third, for a material with a random rough boundary a theory of effective boundary impedance has been developed. Fourth, the effects of random structural imperfections on buckling loads of beams have been computed. (Author)

AD-A078 813/3 PC **A02**/MF **A01**
Northwestern Univ Evanston IL Structural Mechanics Lab
Rapid Propagation of Interface-Flaws in Composite Bodies.
Final rept. 1975-1979,
J. D. Achenbach. Nov 79, 9p NU-SML-TR-79-9, ARO-12791.7-E
Grants DAHC04-75-G-0200, DAAG29-78-G-0031

A summary and a bibliography are presented of the investigations on the rapid propagation of interface flaws in composite bodies, which were carried out at Northwestern University under the sponsorship of the U.S. Army Research-Office during the period July 1, 1975 - September 30, 1979. (Author)

AD-A078 828/1 PC **A05**/MF **A01**
Texas Univ At Austin Dept of Mechanical Engineering
Interface Character of Aluminum/Graphite Metal Matrix Composites.
Technical rept. 1 Dec 77-30 Nov 79,
Harris L. Marcus, and Daniel Laser. 18 Dec 79, 88p
Contract N00014-78-C-0094

One of the problems limiting the application of the aluminum/graphite composites to structural applications is the poor transverse properties. This research program has as a primary purpose the understanding of the contributing factors that govern the transverse strength and methods to improve it. In order to develop a better understanding of the character of the aluminum/graphite interface, a series of experimental approaches have been used. The key approaches taken are: (1) Scanning Auger Electron Spectroscopy (SAM) of the fractured surface; (2) Auger Spectrum deconvolution techniques to evaluate bonding state; (3) X-ray Residual Stress Measurements; (4) TEM - Interface Phase Identification; and (5) Electronic characterization of the interface. The combined approaches are being used to separate out the many factors that may influence the interface strength.

N80-14196/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Burning Characteristics and Fiber Retention of Graphite/Resin Matrix Composites.
K. J. Bowles. 8 Feb 80, 14p NASA-TM-79314, E-271
Conf-Proposed for Presentation at the 35TH Ann. Conf. Of the Reinforced Plastics/Composites Inst., New Orleans, 4-8 Feb. 1980; Sponsored by Soc. Of Plastics Ind.

Graphite fiber reinforced resin matrix composites were subjected to controlled burning conditions to determine their burning characteristics and fiber retention properties. Small samples were burned with a natural gas fired torch to study the effects of fiber orientation and structural flaws such as holes and slits that were machined into the laminates. Larger laminate samples were burned in a modified heat release rate calorimeter. Unidirectional epoxy/graphite and polyimide/graphite composites and boron powder filled samples of each of the two composite systems were burn tested. The composites were exposed to a thermal radiation of 5.3 Btu/sq ft-sec in air. Samples of each of the unfilled composite were decomposed anaerobically in the calorimeter. Weight loss data were recorded for burning and decomposition times up to thirty-five minutes. The effects of fiber orientation, flaws, and boron filler additives to the resins were evaluated. A high char forming polyimide resin was no more effective in retaining graphite fibers than a low char forming epoxy resin when burned in air. Boron powder additions to both the polyimide and the epoxy resins stabilized the chars and effectively controlled the fiber release.

N80-14197/1 PC **A04**/MF **A01**
General Dynamics/Convair, San Diego, CA.
Thermophysical Properties Data on Graphite/Polyimide Composite Materials.
Final Report.
M. D. Campbell, and D. D. Burleigh. Nov 79, 69p NASA-CR-159164, GDC-NAS-79-002
Contract NAS1-15103

Experimental data for the thermal conductivity, thermal expansion, specific heat, and emittance of laminates of HTS/NR 150B2 and HTS/PMR 15 are presented. Measurements were made over the temperature range 116 K to 588 K. Results for the two materials were similar with some differences attributable to laminate quality. Higher expansion coefficients for the HTS/PMR 15 specimens in the resin-dominated directions indicate a higher coefficient for PMR 15 than NR 150B2.

PAT-APPL-6-072 734 PC **A03**/MF **A01**
Department of the Air Force Washington DC
Laser Resistant Ceramic Composite.
Patent Application,
James F. Bacon. Filed 30 Aug 79, 32p AD-D006 773/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A hot pressed, biaxially oriented, alumina fiber reinforced, ceramic composite having alternate layers of parallel running alumina fibers within a glass matrix such that the fibers of one layer are positioned at right angles to the fibers of any adjoining layer. (Author)

11E. Fibers and Textiles

AD-A078 461/1 PC **A11**/MF **A01**
Daedalean Associates Inc Woodbine MD
Engineering Feasibility of Internal Friction Damping as a Nondestructive Evaluation Technique for Synthetic Ropes.
Final rept.,
David C. Fresch, Larry L. Yeager, and A. P. Thiruvengadam. 28 Feb 79, 232p USCG-D-51-79
Contract DOT-CG-828271-A

This report discusses the technical feasibility of applying an internal friction damping, nondestructive evaluation technique for synthetic ropes. Applications for synthetic ropes include mooring lines, towing hawsers and lines for single point moorings (SPM) in deep water ports (DWP). The theory of internal friction damping is presented as it has been historically applied to metallic materials. The report then discusses the methodology for application of the internal friction damping technique to synthetic rope material and construction. The experimental apparatus and specific laboratory technique as applied to six inch and eight inch circumference rope is next discussed in detail. The report then discusses the experimental results and relates the test results to feasibility of employing the test technique as a guideline device for rope deterioration/performance. The report also relates this discussion to characteristics of the ropes tested under both wet and dry conditions. The experimental results section concludes with a comparison of the effect of the internal friction damping for various synthetic rope failure mechanisms.

PAT-APPL-6-083 697 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Process for Producing Transfer Printed Cotton and Cotton Blends.
Patent Application,
Eugene J. Blanchard, Gloria A. Gautreaux, and Robert J. Harper. Filed 11 Oct 79, 16p PB80-134190
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A process is disclosed for the heat transfer printing of cellulose-containing fabrics in garment form with disperse dyestuffs, wherein the fabric is treated only on one side by a printing or spraying technique with a formulation containing highly methylated melamine-formaldehyde crosslinking agent, acid catalyst, and other necessary additives. Fabrics with prints that are durable to washing are produced by simultaneously heat transfer printing and curing at about 190C to 220C for 20-30 seconds.

PB80-120652 PC **A06**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Carbon/Graphite Composite Material Study. First Annual Report.
Technical memo.
May 78, 104p NASA-TM-78718
Sponsored in part by Office of Science and Technology Policy, Washington, DC.

Carbon fibers have opened a wealth of new structural engineering and consumer product opportunities. The potential benefits are higher strength, lighter weight military and commercial products portend energy savings and increased safety. Unfortunately, these benefits are not realized without risk. Inadvertent fiber release, during manufacture or by destruction of the resin binder in fire, is the major hazard associated with composites. The carbon (or graphite) fibers are finer than human hair and if released into the air, they can be easily transported by winds or currents. In contact with electrical devices, they can create resistive loading, short circuits, and arcing, resulting in stoppages or destruction. Their health impact is not fully known and requires careful research and analysis before any firm conclusions can be reached; however, based upon current available information, they are primarily an irritant to the eyes and skin, like fiberglass, rather than carcino-

genic or destructive to lung tissue. Major manufacturers are aware of the unique problems associated with these materials and have successfully applied controls to avoid the in-plant problems.

11F. Metallurgy and Metallography

AD-A078 435/5 PC A03/MF A01
Ocean City Research Corp NJ
Corrosion of Aluminum Alloys in High Velocity Seawater.
Final rept. Jul 78-Jul 79,
G. A. Gehring, Jr. Nov 79, 46p Rept no. OCR-ONR-3
Contract N00014-78-C-0720

A study was undertaken to examine the corrosion behavior of selected aluminum alloys in high velocity seawater. The work is pertinent to the development of high speed ships by the U.S. Navy. The selected aluminum alloys included 1100-H14 and 5456-H117. Plate specimens of each alloy were exposed in a flow channel at test velocities ranging from 3 to 30 m/s. The affect of cathodic polarization on the velocity-related corrosion behavior of the 5456 alloy was also investigated. Under the flow conditions established in the study, the results show that: (1) both the rate and mode of corrosion are velocity-dependent for aluminum alloys (2) velocity-related shifts in corrosion potential can occur (3) polarization resistance measurements are inadequate for predicting corrosion rates of aluminum alloys in high velocity flow (4) cathodic protection cannot retard velocity-induced corrosion of aluminum alloys (5) cathodic polarization will tend to accelerate corrosion of aluminum alloys at all velocities tested (6) at higher velocities, the predominant reduction reaction associated with the corrosion of aluminum alloys is H2O plus le give OH- 1/2 H2.

AD-A078 511/3 PC A03/MF A01
Rutgers - the State Univ Piscataway NJ Dept of Mechanics and Materials Science
X-Ray Analysis of Accrued Damage in Stress Corrosion and Corrosion Fatigue.
Interim technical rept. 1 Dec 78-30 Nov 79,
S. Weissmann, R. Yazici, T. Takemoto, T. Tsakalakos, and I. R. Kramer. 1 Dec 79, 30p
ONR-R-2
Contract N00014-77-C-0191

The defect structure induced in 304 austenitic stainless steel by stress corrosion and in Al 2024 by corrosion fatigue was studied by X-ray rocking curve measurements of the grains and by X-ray Fourier analysis of the line profiles. The surface layer and bulk of the specimens were investigated, and a critical line width parameter corresponding to a critical excess dislocation density was determined that controlled the integrity of the microstructure. Improvements in the speed and efficiency of data collection were made by instrument automation and application of position-sensitive detectors. (Author)

AD-A078 592/3 PC A02/MF A01
Army Materials and Mechanics Research Center Watertown MA
Fatigue Strength of Trip Steels.
Final rept.,
Gregory B. Olson, Richard Chait, Morris Azrin, and Roger A. Gagne. Jun 79, 12p Rept no. AMMRC-TR-79-36

Comparison of the S-N curves of warm-extruded TRIP steels, heat treated to give two stabilities with respect to deformation-induced martensitic transformation during testing, reveals a beneficial effect of the transformation on fatigue behavior under stress control conditions. The proportionality of fatigue strength to ultimate tensile strength is maintained to higher strength levels relative to other steels. For a stress ratio of R = 0.1, a fatigue strength at 10 to the seventh power cycles of 180 ksi (1,240 MPa) is obtained. (Author)

AD-A078 596/4 PC A03/MF A01
National Bureau of Standards Washington DC
Passive Films, Surface Structure and Stress Corrosion and Crevice Corrosion Susceptibility.
Annual rept. Nov 77-Nov 78,
J. Kruger, J. J. Carroll, A. J. Melmed, J. J. Ritter, and J. R. Ambrose. Nov 78, 37p Rept nos. NBSIR-79-1904, NBS-TSR-9
Contract NAonr-18-69

Field ion microscopy (FIM) is capable of imaging defects such as sub-critical crack formation and growth, and surface rearrangements, and of detecting new surface phase formations, and other disturbances. Thus, we have used the technique to characterize various modes of hydrogen reactions with metal surfaces. Previous work from this laboratory has revealed examples of one mode, the initial crack formation and growth in the hydrogen-titanium and hydrogen-zirconium systems. In each case there were indications of preferential crystallographic attack producing cracks within the metal matrix approximately 10-15 atomic layers deep in the case of titanium, and 2-5 layers deep in the case of zirconium. In the present phase of the work, FIM was used to examine microscopic details of the initial stages of hydrogen interactions with some additional pure metals and metal alloys, i.e., niobrium, aluminum, 304 stainless ssteel and iron-24 wt. & chronium steel. The hydrogen-metal interactions occurred during the FIM imaging process with hydrogen pressures between ten to the minus 4th power and ten to the minus 6th power torr at metal temperatures between 20 and 80 K, and while the metal was subjected to stresses brought about by the electric field necessary for imaging the multifacted, approximately hemispherical metal surface. The method used involved comparison of micrographs obtained during inert gas imaging (neon, helim) with micrographs obtained in pure hydrogen or mixtures of hydrogen and inert gases.

AD-A078 598/0 PC A05/MF A01
Franklin Inst Research Labs Philadelphia PA
Stress Corrosion Environmental Effects on AF 1410.
Final rept. 1 May 77-30 Apr 79,
Victor V. Damiano. 1979, 81p FIRL-F-C4708-01, AFOSR-TR-79-1288
Grant AFOSR-77-3341
See also Rept. no. AFML-TR-75-148, AD-A021 174.

AF 1410 plates available from Universal Cyclops through Air Force Materials Laboratory under contract F33615-73-C-5093 were welded using filler wire fabricated from sheet stock of the same composition as the base plate and from 1/16 inch Dia. weld wire prepared by Universal Cyclop from AF-1410 stock. The method of welding was cold wire-gas tungsten arc using manual feed. Satisfactory welds having mechanical properties as welded approaching the properties of the base plate in the double austenitized and aged condition were obtained. SCC tests demonstrated that nonhomogeneous microstructures in the fusion zone may result in nonuniform crack extension and seriously affect estimates made of KISCC.

AD-A078 626/9 PC A08/MF A01
Construction Engineering Research Lab (Army) Champaign IL
Corrosion of Steel Pilings in Seawater: Buzzards Bay -- 1975-1978.
interim rept.,
F. Kearney. Nov 79, 155p Rept no. CERL-IR-M-275

To determine the effect of geography and temperature on corrosion of pilings that support various types of structures in coastal areas, a 5-year study is being conducted at Dam Neck, VA, LaCosta Island, FL, and Buzzards Bay, MA. This report (1) summarizes the results of annual inspections between 1975 and 1978 of the pilings at Buzzards Bay, (2) compares these results with the results of the Dam Neck and LaCosta inspections, and (3) provides electrochemical field test data that will be useful to researchers concerned with coastal structural design. The electrical measurements of corrosion at Buzzards Bay were found to differ drastically from LaCosta and Dam Neck results. These differences were attributed to site-specific factors, and have tentatively been attributed to the high degree of marine life fouling noted on pilings at the Buzzards Bay test sites. It is recommended that further inspections include examinations of the pilings by marine biologists. (Author)

AD-A078 812/5 PC A03/MF A01
Rhode Island Univ Kingston Dept of Ocean Engineering
Hydrogen Entry and Transport Mechanisms in Structural Metals.
Final technical rept.,
R. Heidersbach, Michael Surkein, Ben Allen, and Jeffrey Jones. Nov 79, 42p TR-1, ARO-14057.4-MS
Grant DAAG29-76-G-0311

This report summarizes the results of an investigation into the optimization of the electrochemical hydrogen permeation technique. The results of the research can be summarized as follows: 1. Hydrogen permeation fluxes through iron membranes have been demonstrated to be affected by the reactivity of the membrane surfaces. The use of electroplated palladium entry and exit surfaces is recommended if the object of the study is to measure hydrogen mass transfer rates through a ferrous, or similar metal, membrane. 2. The apparent hydrogen diffusivity rates determined in this research are slower than those commonly reported in the literature. 3. Diffusivities based on times to reach steady-state could not be calculated for electrochemically-charged membranes because steady-state fluxes were never reached during the one-week duration of the permeation experiments. 4. An attempted determination of the effects of electroslag remelting on the hydrogen permeability of high strength steels could measure no significant difference between the steels tested.

AD-A078 829/9 PC A03/MF A01
Systems Research Labs Inc Dayton OH
A Stress-Strain-Time Model (SST) for High-Temperature, Low-Cycle Fatigue.
Technical rept. Jan 78-Aug 79,
Henry L. Bernstein. Aug 79, 32p SRL-6909-01, AFML-TR-79-4114
Contract F33615-76-C-5191

A Stress-Strain-Time Model (SST) has been developed to predict high-temperature, low-cycle fatigue life. The model states that the life can be predicted by three variables--stress, strain, and time. These three variables are combined in a power-law equation to predict the life. The stress parameter accounts for mean stress effects. The strain parameter accounts for time-independent fatigue damage, and the time parameter accounts for the time dependence of fatigue life. High-temperature, low-cycle fatigue data for several alloy systems are correlated to within a factor of 2.1, and data are predicted to within a factor of 2.6 using the SST Model. (Author)

AD-A078 854/7 PC A14/MF A01
Boeing Aerospace Co Seattle WA
Cast Aluminum Structures Technology (CAST). Phase IV. Fabrication of Demonstration Articles and Production Hardware.
Rept. for Jun 77-Mar 79,
Robert C. McField, L. Arne Logan, James W. Faber, and Howard L. Southworth. Mar 79, 301p D180-24610-1, AFFDL-TR-79-3029
Contract F33615-76-C-3111
See also Phase 3, AD-A057 422.

The objective of CAST is to establish the necessary structural and manufacturing technologies and to demonstrate and validate the integrity, producibility, and viability of cast aluminum primary airframe structures. This report summarizes efforts involved in the fabrication of YC-14 Station 170 Body Bulkhead castings. Fabrication phases including model design, pattern fabrication, molding, pouring, trimming, machining and quality control are discussed. (Author)

AD-A078 890/1 PC A02/MF A01
Stanford Univ Calif Dept of Materials Science and Engineering
The Development of Ultrafine, Superplastic Structures in White Cast Irons,
J. Wadsworth, L. E. Eiselstein, and O. D. Sherby. 1979, 12p Rept no. TR-1
Contract N00014-75-C-0662
Pub. in Materials in Engineering Applications, v1 p143-153 Apr 79.

No abstract available.

N80-14234/2 PC A03/MF A01
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

Corrosion Resistance of Sodium Sulfate Coated Cobalt-Chromium-Aluminum Alloys at 900 C, 1000 C, and 1100 C.
G. J. Santoro. Nov 79, 28p NASA-TM-79311, E-267

The corrosion of sodium sulfate coated cobalt alloys was measured and the results compared to the cyclic oxidation of alloys with the same composition, and to the hot corrosion of compositionally equivalent nickel-base alloys. Cobalt alloys with sufficient aluminum content to form aluminum containing scales corrode less than their nickel-base counterparts. The cobalt alloys with lower aluminum levels form CoO scales and corrode more than their nickel-base counterparts which form NiO scales.

N80-14243/3 PC **A03/MF A01**
Office National d'Etudes et de Recherches Aerospatiales, Chatillon-sous-Bagneux (France). Lab. Thermochimie et Frittage.
The Improvement of Refractory Alloys Through Powder Metallurgy Involving Sintering with Spinning Elaboration d'Alliages Refractaires Par Metallurgie des Poudres au Moyen du Frittage-Filage.
Final Report.
A. Hivert, M. Marty, and A. Walder. Aug 78, 44p ONERA-RT-12/1931-MY
Contracts DGRST-73-7-1813, DGRST-75-7-0992
Language in French.

Several powder metallurgy manufacturing processes for hot turbine disks using IN-100 and Astroloy alloys were tested in order to avoid the macro crystallization and phase separation introduced by casting. The influence of powder characteristics, compactation processes (spinning or isostatic hot compression), and of thermal treatments were studied in particular. It is concluded that powder metallurgy gives superior properties in the lower temperature range, up to 750 C. Spinning is the best compaction method for refractory alloys with normal carbon content.

PATENT-4 167 459 Not available NTIS
Department of the Interior, Washington, DC.
Electroplating with Ni-Cu Alloy,
Patent,
Agnes Y. Lee, Wilbert L. Falke, and Alfred E. Schwaneke. Filed 8 Jan 79, patented 11 Sep 79, 4p PB80-120363, PAT-APPL-001 818
Supersedes PB-296 767.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Nickel-copper alloy is plated on a metal substrate by electrodeposition of the alloy from an acetate electrolyte solution.

PATENT-4 167 555 Not available NTIS
Department of the Interior, Washington, DC.
Extraction of Tungsten from Ores.
Patent,
John M. Gomes, Daniel A. O'Keefe, and Andrea E. Raddatz. Filed 15 Dec 78, patented 11 Sep 79, 3p PB80-120348, PAT-APPL-969 768
Supersedes PB-292 211.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Tungsten is extracted from hot springs tungsten ores by means of a process comprising (1) calcining the ore, (2) quenching the calcined ore in aqueous alkaline solution and (3) treating the resulting slurry at elevated temperature and pressure to extract the tungsten values from the ore.

PB80-119126 Not available NTIS
National Bureau of Standards, Washington, DC.
Positron Annihilation Study of Defects in Titanium.
Final rept.,
R. C. Reno, L. J. Swartzendruber, and L. H. Bennett. Oct 79, 4p
Pub. in NDT (Non-Destructive Testing) International, p224-227, Oct 79.

Positron annihilation linewidth measurements have been used to study defect behavior in titanium samples which were first cold-worked and then annealed at temperatures ranging up to 850C. The line width for a highly deformed high purity (0.9998) sample showed a gradual increase with increasing annealing temperature up to the recrystallization temperature, above which there was a rapid increase. In contrast, a commercially pure (0.9984) sample deformed by 20% displayed a smooth increase in linewidth over the entire annealing range. Hardness measurements correlate reasonably well with the overall trend of the positron lineshape parameter, but the positron annihilation measurements reveal defect changes that occur at temperatures too low to give any observed changes in hardness.

PB80-121346 Not available NTIS
National Bureau of Standards, Washington, DC.
Toughness, Fatigue Crack Growth, and Tensile Properties of Three Nitrogen-Strengthened Stainless Steels at Cryogenic Temperatures.
Final rept.,
D. T. Read, and R. P. Reed. 1979, 30p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Proc. Symp. 107th AIME Ann. Meeting, Denver, CO, Mar 2, 1978. Paper in the Metal Science of Stainless Steels, p92-121, Metallurgical Society of the American Inst. of Mechanical Engineers, Warrendale, PA, 1979.

Fracture toughness, fatigue crack growth rate, and tensile property data for three nitrogen-strengthened stainless steels at 295, 76, and 4 K have been obtained. These materials were tested to investigate their suitability as structural materials for cryogenic service. The materials tested were nitrogen-strengthened Fe-18Cr-3Ni-13Mn, Fe-21Cr-12Ni-5Mn, and Fe-19Cr-9Ni-2Mn. Toughness measurements employed J-integral, plane strain critical stress intensity, and crack-opening-displacement tests. It was found that the nitrogen-strengthened austenitic stainless steels generally exhibit lower toughness at 4 K than the widely used 300-series stainless steels. Of the nitrogen-strengthened steels tested to date, Fe-18Cr-3Ni-13Mn is the strongest and least tough, and Fe-19Cr-9Ni-2Mn is the toughest and least strong. Fatigue crack growth rates at 4 K in the nitrogen-strengthened stainless steels were found to be generally higher than or comparable to rates for previously tested stainless steels. Fe-18Cr-3Ni-13Mn had rates significantly above previously tested materials, especially at high stress intensity range levels. Four Kelvin crack growth rates for Fe-19Cr-9Ni-2Mn and Fe-21Cr-12Ni-5Mn fell approximately in the mid-range of previous data for austenitic stainless steels at 4 K. All studied materials exhibited high strengths at cryogenic temperatures. After being strained to failure at 4 and 76 K, Fe-18Cr-3Ni-13Mn and Fe-19Cr-9Ni-2Mn exhibited some ferromagnetism, indicating that martensitic transformations had occurred; Fe-21Cr-12Ni-5Mn exhibited no ferromagnetism.

PB80-122765 PC **A03/MF A01**
Bureau of Mines, Avondale, MD. Avondale Metallurgy Research Center.
Composition Depth Profiles and the Effects of Annealing for Ion-Implanted Alloys.
Rept. of investigations,
A. B. Campbell, III, B. D. Sartwell, and P. B. Needham, Jr. 1979, 31p BUMINES-RI-8387

The Bureau of Mines is developing alloys using ion implantation as an alternative to bulk alloys that consume large quantities of strategic materials such as chromium and nickel. These alloys are formed at the outer layer of relatively common materials. To more fully understand the corrosion characteristics and physical properties of this outer layer, it was necessary to determine the alloy concentration as a function of depth into the substrate material. Also, since many of the ion-implanted alloys would be utilized at elevated temperatures, it was necessary to determine the diffusion behavior of the implanted element. Proton-induced X-ray emission and inert gas ion sputtering have been utilized to generate composition depth profiles for Fe-Cr, Fe-Ni, and Fe-Al ion implanted alloys fabricated by implanting 25-kev Cr(+), Ni(+), or Al(+) into iron substrates. The data were fitted (utilizing a computer program) with symmetrical Gaussian profiles yielding values for the range and range straggle of the ions. These parameters were then compared with those calculated from theory. Changes in the profiles due to annealing were investigated and values for the diffusion coefficient were obtained assuming diffusion according to Fick's Law. For the Cr(+) and Ni(+) implantation, the profiles as-implanted agree reasonably well with theory and exhibit 'normal' diffusion characteristics at 500C. For the Al+ implantation, the profile as-implanted is much broader than predicted and exhibits substantial enhanced diffusion at temperatures up to 500C.

PB80-122906 Not available NTIS
National Bureau of Standards, Washington, DC.
Fundamental Aspects of the Corrosion of Metallic Implants.
Final rept.,
J. Kruger. 1979, 21p
Pub. in Am. Soc. Test. Mater. Spec. Tech. Publ. 684, p107-127 1979.

The corrosion of metals in the aqueous environments of body fluids involves the setting up of electrochemical corrosion cells. The corrosion produced by these cells is controlled by thermodynamic and kinetic factors. The thermodynamic factors determine the corrosion tendencies; the kinetic factors determine the rate. Galvanic corrosion is affected by both thermodynamic and kinetic factors and occurs when two metals with widely differing potentials are placed in contact with each other. Other forms of corrosion depend more directly on factors controlling the rate of corrosion. For most alloys used in implants the corrosion rate is mainly dependent on the protective properties of the thin passive films that exist on the surfaces of these alloys. The quality of the protection afforded by passive films is related to their ability to resist chemical breakdown by damaging species and, once broken down, their ability to reform rapidly (repassivate). The interplay between breakdown and repassivation is important in determining the susceptibility of metallic implants to pitting, crevice corrosion, stress corrosion, corrosion fatigue, intergranular corrosion, and fretting corrosion.

PB80-122930 Not available NTIS
National Bureau of Standards, Washington, DC.
Tensile and Fracture Behavior of a Nitrogen-Strengthened, Chromium-Nickel-Manganese Stainless Steel at Cryogenic Temperatures.
Final rept.,
R. L. Tobler, and R. P. Reed. 1979, 16p
Pub. in Am. Soc. Test. Mater. Spec. Tech. Publ. 668, p537-552 1979.

J-integral fracture and conventional tensile properties are reported for an electroslag remelted Fe-21Cr-6Ni-9Mn austenitic stainless steel that contains 0.28 percent nitrogen as an interstitial strengthening element. Results at room (295 K), liquid-nitrogen (76 K), and liquid-helium (4 K) temperatures demonstrated that the yield strength and fracture toughness of this alloy are inversely related and strongly temperature dependent. Over the investigated temperature range, the yield strength tripled to 1.24 GPa (180 ksi) at 4 K. The fracture toughness, as measured using 3.8-cm-thick (1.5 in.) compact specimens, decreased considerably between 295 and 4 K. During plastic deformation at 295 K the alloy undergoes slight martensitic transformation, but at 76 and 4 K it transforms extensively to martensites. The amount of body-centered cubic (bcc) martensite formed during tension tests was measured as a function of elongation.

PB80-125867 PC **A03/MF A01**
Bureau of Mines, Rolla, MO. Rolla Metallurgy Research Center.
Properties of Manganese-Copper Alloys Prepared from Metal Powders.
Rept. of investigations 1979,
J. L. Holman, R. L. Crosby, and L. A. Neumeier. 1979, 39p BUMINES-RI-8383

The Bureau of Mines has extended its previous development of cast Mn-Cu damping alloys to powder metallurgy (P/M) consolidation of alloys containing 55 to 75 wt-pct Mn. Blends of minus 200-mesh elemental powders were compacted cold in directional and isostatic presses. With 1 pct binder, typical green densities ranged between 76 and 80 pct of theoretical when pressing at 30 or 48 tsi. Green strength increased with compacting pressure and copper content. As-sintered tensile

strengths ranged to 60,000 psi for a hydrogen-sintered 60Mn-40Cu alloy, along with 5-pct elongation. Sintered densities ranged between 90 and 96 pct of theoretical. Sintering was effective when holding for 1 hr at maximum temperatures of 900 to 1,040C, dependent on composition. Strength and ductility was considerably lower than for equivalent cast alloys. When aged to the damping condition, alloys containing 60 to 70 pct Mn exhibited >40 pct specific damping capacity (SDC) at 5,000-psi stress, considerably higher than values reported for equivalent cast material. Effects of 1 or 3 pct Sn or Zn additions on SDC and other properties were assessed. Trials were conducted on consolidating rings and gears of the 65Mn-35Cu alloy on industrial-type P/M equipment.

PB80-125875 PC **A02/MF A01**
Bureau of Mines, Rolla, MO. Rolla Metallurgy Research Center.
Superplasticity in Selected Magnesium-Base Alloys.
Rept. of investigations 1979,
M. M. Tilman, R. L. Crosby, and L. A. Neumeier. 1979, 23p BUMINES-RI-8382

Research was conducted by the Bureau of Mines to determine the potential for superplastic forming of magnesium-base alloys. The suitability of these alloys for superplastic forming may provide added incentive for the use of domestically available magnesium as a substitute for metals requiring imported raw materials. Commercial compositions of the alloys ZK60A (Mg-5.5Zn-0.45Zr) and AZ61A (Mg-6.5Al-1Zn) were melted, cast, and extruded to 3/8-inch diameter rod having average grain diameters of less than 10 micrometers. Tensile testing was conducted to delineate parameters of superplasticity at temperatures ranging from 270 to 330C and initial strain rates of 0.002 to 2.0/min. A maximum strain-rate sensitivity index of approximately 0.65 at 310C and 0.002/min strain rate was determined for AZ61A, which was not known previously to be superplastic. For 2K60A, calculations of experimentally derived data indicated a maximum strain-rate sensitivity index of approximately 0.45 at 310C between 0.04 and 0.1/min strain rate. Maximum elongations of over 680 pct and 700 pct were obtained for AZ61A and ZK60A, respectively. The potential for commercial superplastic forming would appear somewhat more favorable for ZK60A than for AZ61A, because ZK60A retains higher strengths after deformation than does AZ61A, and maximum superplasticity occurs at higher strain rates in ZK60A, which facilitates forming.

PB80-803877 PC **N01/MF N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Eutectic Alloys (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1976-Jan 80,
Peter Moore. Jan 80, 66p
Sponsored in part by National Technical Information Service, Springfield, VA.

These abstracts from the international literature provide summaries of the preparation, treatments, composition and structure, and properties of eutectic alloys. Techniques for directional solidification and treatments including glazing, coating, and fiber reinforcement are discussed. In addition to the mechanical and thermal properties, the superconducting, corrosion resistance, and thermionic emission and adsorption properties are described in a number of instances. (Contains 250 citations)

PB80-804552 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Sea Water Corrosion. Volume 2. 1976-January, 1980 (Citations from the NTIS Data Base).
Rept. for 1976-Jan 80,
William E. Reed. Feb 80, 285p
Supersedes NTIS/PS-79/0098, NTIS/PS-78/0055 and NTIS/PS-77/0053. See also Volume 1, 1964-1975, NTIS/PS-77/0052.

Citations on ships, offshore platforms, steel pilings, cables, and marine equipment are presented. The materials studied include ferrous and nonferrous metals, concrete, and composites. (This updated bibliography contains 278 abstracts, 65 of which are new entries to the previous edition.)

11H. Oils, Lubricants, and Hydraulic Fluids

AD-A078 454/6 PC **A02/MF A01**
Rensselaer Polytechnic Inst Troy NY Dept of Mechanical Engineering Aeronautical Engineering and Mechanics
Fourier Emission Infrared Microspectrophotometer for Surface Analysis. I. Application to Lubrication Problems.
James L. Lauer, and Vincent W. King. 1979, 20p AFOSR-TR-79-1129
Grants AFOSR-78-3473, NASA-NSG-3170
Pub. in Infrared Physics, v19 p395-412 1979.

No abstract available.

N80-14404/1 PC **A11/MF A01**
University Coll. of Swansea (Wales). Tribology Centre.
Low Temperature Lubrication.
A. R. Lansdown, and H. M. Briscoe. 27 Apr 78, 229p STC-76/376, ESA-CR(P)-1120
Contract ESTEC-3264/77-NL-PP(SC)

A survey intended to provide designers of spacecraft systems and other users with guidance to the selection of an appropriate lubrication system for any low temperature application is presented. The available published literature on low temperature lubrication is reviewed and summarized. Because the information is relatively sparse, it was supplemented by data on the fundamentals of tribology as related to low temperature and on the effects of low temperatures on materials. Guidance to lubricant selection in relation to specific low temperature situtions is given. A full bibliography is also provided.

11I. Plastics

AD-A078 496/7 PC **A03/MF A01**
Naval Research Lab Washington DC
Shock and Vibration Performance of an Epoxy Chocking Compound.
Final rept. Oct 77-Sep 79,
E. W. Clements. 7 Dec 79, 46p Rept no. NRL-MR-4128

For some years, various epoxy compounds have been used to form machinery/equipment chocks on merchant ships. In application, the item to be mounted is located and aligned, and supported in place by some temporary means while the chocking compound is mixed and poured in place. The advantages are speed, economy and intimacy of fit compared to conventional methods. More recently, these compounds have been used to a limited extent on Navy combatants, where shock and vibration environments are much more severe than those encountered in the mercantile fleet. In order to evaluate the ability of poured epoxy chocks to withstand these environments, two structures have been constructed which resemble equipment items which have been so mounted on combatants in terms of mounting footprint, weight and overturning moment. These have been subjected to shock and vibration tests similar to those required by the Navy for acceptance of shipboard equipment. The epoxy chocks were unaffected by the vibration test, while under shock test they sustained minor cracking and spalling, but without significant reduction of load-bearing area and no impairment of alignment function. It was concluded that their performance was satisfactory for the test situations employed. It should be cautioned, however, that other environmental factors (termperature, humidity, contaminants, etc.) than those considered here may also be effective, and that other mechanical situations might modify the results observed. Such factors should be evaluated for any contemplated installation. (Author)

AD-A078 530/3 PC **A03/MF A01**
Ogden Air Logistics Center Hill AFB UT Propellant Lab Section
Qualification of a New MAPO Source and ERL-510 Curing Agent for Minuteman Stage 1 UF-2121 Liner.
Semi-annual rept.,
John A. Thompson. Jul 79, 28p Rept no. MANCP-419(79)

Thiokol Chemical Corporation/Wasatch Division uses MAPO in the production of UF-2121 liner. Thiokol changed MAPO vendors and, therefore, qualification of the new source MAPO was required. Thiokol prepared specimens from the new source and also specimens from the original source which are to be used as the control material in the 10 year surveillance testing program. The specimens were transferred to Ogden ALC for testing and reporting of the data obtained. This report includes the test results for the first, second, third, fourth, and fifth time testing of the control and special specimens at Ogden ALC. In all instances, the mean data for the control and special specimens are well above the minimum requirements found in TWR-7857 A, Thiokol specimen data. Therefore, the capability of the liner from the new source material is expected to perform satisfactorily. (Author)

AD-A078 616/0 PC **A03/MF A01**
Naval Surface Weapons Center White Oak Lab Silver Spring MD
Moisture Effects on the Mechanical Properties of Hercules 3501-6 Epoxy Resin.
Progress rept. Oct 77-Oct 78,
Joseph M. Augl. 30 Mar 79, 45p Rept no. NSWC/TR-79-41

The following properties of the Hercules 3501-6 epoxy resin were determined: Young's modulus, shear modulus, Poisson's ratio, ultimate strength, and ultimate strain, all as a function of temperature (between 21 and 150 C) and as a function of moisture concentration corresponding to an equilibrium concentration from 0-100 percent relative humidity. The purpose of this investigation was to obtain the necessary constituent material property data for predicting the environmental response of 3501-6 carbon fiber reinforced composites. (Author)

AD-A078 705/1 PC **A02/MF A01**
Penwalt Corp King of Prussia PA Central Research and Development Dept
The Crystallization Thermodynamics of Piezoelectric Copolymers.
Technical rept.,
Harry Stefanou. Nov 79, 25p Rept no. TR-2
Contract N00014-77-C-0130

The crystallization of piezoelectric vinylidene fluoride-tetrafluoroethylene and vinylidene fluoride-hexafluoropropylene copolymers was investigated. Several compositions of each copolymer were synthesized and the melting point depression was evaluated as a function of composition. Models were examined in which the comonomers were included as defects in the crystal lattice or in which they were excluded. The need to use several approaches before a conclusion can be reached is clearly seen. Our studies indicate that the exclusion model is a less accurate description of the crystallization of these two copolymers. Values for the enthalpy of defect incorporation are evaluated and shown to be reasonable. (Author)

AD-A078 731/7 PC **A03/MF A01**
Massachusetts Inst of Tech Cambridge Dept of Chemical Engineering
Synthesis Characterization and Morphology of a Cis 1,4 Polyisoprene/Poly n-Butylmethacrylate Diblock Copolymer.
Technical rept.,
Robert E. Cohen, and Frank S. Bates. 14 Dec 79, 27p Rept no. TR-4
Contract N00014-77-C-0311

Homogeneous anionic polymerization methods were employed to synthesize a diblock copolymer of the form (A)(n)-b-(B)(m) in which repeat unit A is isoprene, B is n-butylmethacrylate and b is a single unit of 1,1 diphenylethylene. Various physical-chemical characterization methods were employed to determine that the molecular weights of the A and B blocks are 80,000 and 160,000 g/mole respectively. NMR spectra indicated that the poly n-butylmethacrylate moiety is composed predominantly of syndiotactic triads. Thermal analysis and dynamic mechanical testing were used to determine the polyisoprene and poly n-butylmethacryiate glass transition temperatures, which were around -70 and 20 C respectively; the poly n-butylmethacrylate transition observed in the viscoelastic experiments was unusually broad, covering more than 75 C from onset to completion. Thin films of the diblock copolymer prepared by solvent evaporation casting methods, using a variety of

solvents and a wide range of solvent evaporation rates, showed a variety of morphologies in transmission electron micrographs. Most notable among these was a structure obtained in rapid-evaporation castings which contained relatively large regions of homogeneous diblock copolymer embedded in the microphase-separated material. While these homogenized regions remain unchanged indefinitely in the bulk material at room temperature, they tend to decompose to the stable microphase-separated material upon heating or upon addition of solvent. (Author)

AD-A078 838/0 PC **A05/MF A01**
Acurex Corp Mountain View CA Aerospace Systems Div
Synthesis of Improved Polyester Resins.
Final rept.,
A. H. McLeod, and C. B. Delano. 5 Jul 79, 91p
ACUREX-FR/79-13/AS, NASA-CR-159665
Contract NAS3-21374

Eighteen aromatic unsaturated polyester prepolymers prepared by a modified interfacial condensation technique were investigated for their solubility in vinyl monomers and ability to provide high char yield forming unsaturated polyester resins. The best resin system contained a polyester prepolymer of phthalic, fumaric and diphenic acids reacted with 2,7-naphthalene diol and 9,9-bis(4-hydroxphenyl) fluorene. This prepolymer is very soluble in styrene, divinyl benzene, triallyl cyanurate diallyl isophthalate and methylvinylpyridine. It provided anaerobic char yields as high as 41 percent at 800 c. The combination of good solubility and char yield represents a significant improvement over state-of-the-art unsaturated polyester resins. The majority of the other prepolymers had only low or no solubility in vinyl monomers. Graphite composites from this prepolymer with styrene were investigated. The cause for the observed low shear strengths of the composites was not determined, however 12 week aging of the composites at 82 C showed that essentially no changes in the composites had occurred. (Author)

AD-A078 954/5 PC **A03/MF A01**
Dayton Univ OH Research Inst
Structure Modification of Fluorocarbon Ether Bibenzoxazole Polymers to Improve Hydrolytic Stability.
Final technical rept. Jun 75-May 78,
R. C. Evers, G. J. Moore, and J. L. Burkett. Oct 79, 37p AFML-TR-79-4149
Contract F33615-75-C-5095

Hydrolytically and thermooxidatively stable fluorocarbon ether bibenzoxazole (FEB) polymers were synthesized by the acetic acid-promoted polycyclocondensation of fluorocarbon ether bis (o-aminophenol) monomers with novel fluorocarbon ether dithioimidate ester monomers. The dithioimidate esters were derived from hexafluoropropylene oxide (HFPO) or, preferably, from a combination of tetrafluoroethylene oxide (TFEO) and HFPO. The latter class of TFEO:HFPO-derived dithioimidate esters was tailored to impart improved hydrolytic stability to the resultant FEB polymers while minimizing undesirable, concomitant increases in polymer glass transition temperatures (Tg). The polymers were obtained in moderate-to-high molecular weight and exhibited inherent viscosities in the range of 0.20 to 0.41 dl/g. Polymer structures were verified by elemental and infrared spectral analysis. Lower polymer Tg's were obtained with increased fluorocarbon ether content, a minimum value of -48 C (-55 F) being achieved. High thermooxidative stability of the HFPO- and TFEO:HFPO-based FEB polymers was substantiated by thermogravimetric analysis and isothermal aging studies in air. After isothermal aging in air for 200 hours at 288 C (550 F) and 260 C (500 F), respresentative polymers exhibited weight losses of 17 and 7 percent, respectively. Hydrolytic stability of the polymers was evaluated by exposure to a 95 percent relative humidity, 93 C (200 F) environment for prolonged periods of time. Based on comparative polymer Tg, inherent viscosity and infrared spectral data, the HFPO- and TFEO:HFPO-based FEB polymers exhibited vastly improved hydrolytic stability over analogous TFEO-based FEB polymers.

PAT-APPL-6-069 476 PC **A02/MF A01**
Department of the Air Force Washington DC
Articulated Para-Ordered Aromatic Heterocyclic Polymers Containing Diphenoxybenzene Structures.
Patent Application,
Robert C. Evers. Filed 24 Aug 79, 17p AD-D006 772/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

As described in the literature, p-benzobisoxazole polymers, e.g., poly(benzo(1,2-d:5,4-d') bisoxazole-2,6-diyl)-1,4-phenylene, can be synthesized with inherent viscosities of up to 3.7 dl/g. These polymers possess high thermooxidative stability and, because of their all-para, rod-like character, they are capable of forming liquid crystalline phases in concentrated solutions of methanesulfonic acid. Ultra-high strength, high modulus fibers possessing a high degree of oriented, crystalline character can be obtained from these solutions. However, attempts to cast strong films from the methanesulfonic acid solutions have been unsuccessful. It has been possible to obtain only very brittle films. (Author)

PATENT-4 178 428 Not available NTIS
Department of the Air Force Washington DC
Thermally Stable Enyne Polysulfone Polymers.
Patent,
Fred E. Arnold, and Bruce A. Reinhardt. Filed 27 Sep 78, patented 11 Dec 79, 7p AD-D006 795/9, PAT-APPL-946 291
Supersedes PAT-APPL-946 291-78, AD-D005 578.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

High molecular weight enyne polysulfone thermoplastics are prepared by the reaction of alkali metal salts of 1,4-bis(3-hydroxyphenyl)-buta-l-ene-3-yne and various aromatic diols with aromatic dihalosulfones. Because of the presence of the enyne moiety in the polymer backbone, the polymer can be lightly crosslinked to provide solvent resistant thermoplastics. The polymers are useful in fabricating graphite thermoplastic composites for structural applications.

11K. Solvents, Cleaners, and Abrasives

PB80-128812 PC **A07/MF A01**
Monsanto Research Corp., Dayton, OH.
Source Assessment: Solvent Evaporation - Degreasing Operations.
Final rept.,
T. J. Hoogheem, D. A. Horn, T. W. Hughes, and P. J. Marn. Aug 79, 133p MRC-DA-640, EPA/600/2-79/019F
Contract EPA-68-02-1874

This report describes a study of air emissions from solvent degreasing and fabric scouring operations. This study was completed to provide EPA with sufficient information to determine whether additional control technology needs to be developed for these emission sources. Degreasing operations include: (1) cold cleaning; (2) open top vapor degreasing; (3) conveyorized vapor degreasing; and (4) fabric scouring. These four types consumed an estimated 943,000 metric tons of solvent in an estimated 1,255,000 operating locations in 1974. To assess the potential environmental effect of emissions (hydrocarbons) resulting from degreasing operations, the source severity (defined as the ratio of the time-averaged maximum ground level concentration of a pollutant to a potentially hazardous concentration) was calculated for each solvent emitted from each type of representative degreaser. Methylene chloride (2.2) and perchloroethylene (1.2) from conveyorized vapor degreasing had the two largest source severities. Solvent consumption for degreasing is expected to grow at an annual rate of 4% through 1980. If the 1980 level of emissions control is the same as the 1974 level, emissions from degreasing operations will increase by 26% over that period.

PB80-804560 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Detergents, Soaps, and Surface Active Cleaners. Volume 2. 1977-January, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-Jan 80,
Diane M. Cavagnaro. Feb 80, 156p
Supersedes NTIS/PS-79/0088, NTIS/PS-78/0116 and NTIS/PS-77/0131. See also Volume 1, 1964-1976, NTIS/PS-78/0115.

Synthesis, composition, production, and performance of surface active cleaning compounds are cited in this bibliography. Advertising substantiation reports from the Federal Trade Commission are included. However, oil and fuel additives, oil spill treatment chemicals, and water pollution by surfactants are excluded. (This updated bibliography contains 149 abstracts, 46 of which are new entries to the previous edition.)

11L. Wood and Paper Products

AD-A078 710/1 PC **A02/MF A01**
Forest Products Lab Madison WI
Age of Wood — Extending the Timber Resource.
Rept. for 1979-1980.
1980, 14p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Errata sheet inserted.

Trees are a natural resource that is eminently renewable, expandable and flexible. The extent to which society can take advantage of these attributes is governed, in large degree, by technology. Utilization technology, in particular, influences the effective size of the resource--in relation to national requirements. This report describes some of the most recent findings from research, by the Forest Products Laboratory and cooperating universities, aimed at extending U.S. timber supplies. It emphasizes more efficient use of wood in housing, processing of hardwoods and logging-residue-type materials, increased yield from small sawlogs, and protection of wood from decay. It also explains briefly the general programs of the Laboratory and describes technology transfer efforts.

AD-A078 786/1 PC **A02/MF A01**
Forest Products Lab Madison WI
How to Estimate Recoverable Heat Energy in Wood or Bark Fuels.
Forest Service general technical rept.,
Peter J. Ince. 1979, 12p Rept no. FSGTR-FPL-29

A reference source is provided for estimating the amount of heat energy that may be recovered using wood or bark fuel in typical furnace and boiler or hot air combustion heat recovery systems. A survey of reported data on higher heating values for various species of wood and bark fuels is provided. A set of formulas of a type commonly used by combustion technologists is also provided for estimating combustion system heat losses and net recoverable heat energy per pound of fuel as-fired, based on fuel higher heating value, moisture content, and excess air, stack gas temperature, and ambient temperature assumptions. (Author)

AD-A078 787/9 PC **A02/MF A01**
Forest Products Lab Madison WI
Mean and Tolerance Limit Stresses and Stress Modeling for Compression Perpendicular to Grain in Hardwood and Softwood Species.
Forest Service research paper,
B. Alan Bendtsen, and William L. Galligan. 1979, 17p Rept no. FSRP-FPL-337

Tables characterizing the stress-compression relationship of wood in compression perpendicular to grain for several species are presented here. Complete characterization results are included, as well as selected regression models for characterizing other species. Use of the tables and models is illustrated via discussion and graphs. (Author)

AD-A078 788/7 PC **A02/MF A01**
Forest Products Lab Madison WI
Bending Strength of Large Alaskan Sitka Spruce and Western Hemlock Log Bridge Stringers.
Forest Service research paper,
R. L. Tuomi, R. W. Wolfe, R. C. Moody, and F. W. Muchmore. 1979, 20p Rept no. FSRP-FPL-341

Native log stringer bridges are important economical and practical structures for logging roads in remote areas of Alaska. Unfortunately, the current knowledge of the strength of large logs is extremely limited. In the absence of actual test data, design stressess have been estimated by procedures developed for poles and piles. To obtain actual data on the strength of large logs, a field test facility was designed and 40 large logs were tested to destruction. These were probably the largest logs ever tested, with butt diameters up to 4 feet, 10 inches and ultimate bending loads in excess of 120,000 pounds. This study was limited to two species, Sitka spruce and western hemlock. The average breaking strengths were 4,530 pounds per square inch (lb sq in) for Sitka spruce and 4,680 lb /sq in for western hemlock. Both values are reasonably close to those obtained by the current design procedure. Statistical curves for estimating near-minimum strengths at various confidence levels were developed. It is normal practice in the design of wood structures to reduce the allowable stresses to a 10-year duration of maximum load. This is unrealistic for bridges where the maximum design load is present for only a short period. A cumulative load duration of 2 months is more realistic. A simple curve for stress adjustments at different load periods is presented. (Author)

AD-A078 790/3 PC **A02/MF A01**
Forest Products Lab Madison WI
California Black Oak Drying Problems and the Bacterial Factor.
Forest Service research paper,
James C. Ward, and Del Shedd. 1979, 18p Rept no. FSRP-FPL-344

This paper reports on a cooperative study between the U.S. Forest Products Laboratory (FPL) and the Kimberly-Clark Corporation to explore the causes and extent of drying degrade in 4/4 black oak lumber from several different saw timber stands in Shasta County, California. Most drying degrade in this study was traced to heartwood that was weakened by anaerobic bacteria in the living tree. We believe bacterial tree infections may be responsible for most of the unexpected drying degrade in California black oak lumber in general.

AD-A078 791/1 PC **A02/MF A01**
Forest Products Lab Madison WI
Drying Procedures for Bacterially Infected Northern Red Oak Lumber.
Forest Service research paper,
John M. McMillen, James C. Ward, and Joseph Chern. 1979, 18p Rept no. FSRP-FPL-345

This paper gives the results of more recent research to derive satisfactory procedures for drying infected 4/4 red oak under conditions milder than kiln schedule T4-D2. This research followed principles of kiln schedule development in response to drying strain outlined by McMillen whereby three factors affecting drying stresses must be considered: Temperature, relative humidity, and time. Successful development of a schedule depends upon determining the optimum combination of the three factors during drying lumber from green to final moisture content (MC). Surface and end checking, honeycombing, and ring failure result from shrinkage stresses caused by drying wood below the fiber saturation point. Prolonged exposure to excessive temperature while any of the wood is above the fiber saturation point weakens the wood and increases its susceptibility to interior checking and collapse.

AD-A078 851/3 PC **A02/MF A01**
Forest Products Lab Madison WI
Increment Cores How to Collect, Handle, and Use Them.
General technical rept.,
Robert R. Maeglin. 1979, 20p Rept no. FSGTR-FPL-25

This paper describes increment cores (a useful tool in forestry and wood technology) and their uses which include age determination, growth increment, specific gravity determination, fiber length measurements, fibril angle measurements, cell measurements, and pathological investigations. Also described is the use and care of the increment borer which is essential in obtaining good cores. A caution is also given as to the tree damage that boring can cause, with suggestions for minimizing damage. (Author)

PB80-124589 (Order as PB80-124548, PC **A05/MF A01**)
National Bureau of Standards, Washington, DC. National Measurement Lab.
Tensile Behavior of Some Mathematical Models of Paper Networks.
Jack C. Smith. 20 Apr 79, 20p
Included in Jnl. of Research of the National Bureau of Standards, v84 n4 p299-318, Jul-Aug 79.

The tensile behavior of a thin web-like paper network was imulated by two simple mathematical models. The mesh distortion, drop in tensile force and energy loss resulting from breakage of a network junction were calculated. These results were used to formulate two parameters for characterizing interfiber adhesion: a parameter averaging the network energy losses incurred in a series of bond breaks when the network is elongated and a parameter averaging the force drops. The effect of mesh size, local bond adhesive force, and size and shape of the specimen network were calculated. These results based on model studies were used to interpret behavior observed in an actual paper network.

PB80-133804 PC **A07/MF A01**
WAPORA, Inc., Washington, DC.
Environmental Impact Assessment Guidelines for New Source Pulp and Paper Mills.
Final rept.,
Gene V. Beeland, D. Keith Whitenight, and Kenneth G. Barnhill. Sep 79, 126p 613C, EPA-130/6-79-002
Contract EPA-68-01-4157

The report provides guidance for evaluating the environmental impacts of a proposed pulp and paper mill requiring a new source National Pollutant Discharge Elimination System (NPDES) permit from the Environmental Protection Agency (EPA) to discharge wastewater to the navigable waters of the U.S. The guidelines are intended to assist in the identification of potential impacts, and the information requirements for evaluating such impacts, in an Environmental Information Document (EID). The report includes guidance on (1) identification of potential wastewater effluents, air emissions, and solid wastes from pulp and paper mills, (2) assessment of the impacts of new facilities on the quality of the environment, (3) state-of-the-art technology for in-process and end-of-process control of waste streams, (4) evaluation of alternatives, and (5) environmental regulations that apply to the industry.

PB80-804412 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Wood Bonding (Citations from the NTIS Data Base).
Rept. for 1964-Dec 79,
Robena J. Brown. Feb 80, 149p
Supersedes NTIS/PS-79/0068 and NTIS/PS-78/0007. For the companion Published Searches of the Engineering Index Data Base, see PB80-804420 and PB80-804436.

The bibliography cites research reports which describe wood bonding techniques, types of glues and adhesives, effects of wood properties, and the mechanical properties of bonded joints. (This updated bibliography contains 142 abstracts, none of which are new entries to the previous edition.)

PB80-804420 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Wood Bonding. Part 1. Plywood Bonding (Citations from the Engineering Index Data Base).
Rept. for 1970-79,
Robena J. Brown. Feb 80, 84p
Supersedes NTIS/PS-79/0069 and NTIS/PS-78/0008. For the companion Published Search of the NTIS Data Base, see PB80-804412.

The bibliography cites research reports from world wide literature on bonding plywood. Types of adhesives and curing methods are described. Specification tests for shear strength of plywood, and methods of nailing and bonding construction joints are included. (This updated bibliography contains 77 abstracts, 4 of which are new entries to the previous edition.)

PB80-804438 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Wood Bonding. Part 2. Lumber, Particle Board, and Fiber Board Bonding (Citations from the Engineering Index Data Base).
Rept. for 1970-79,
Robena J. Brown. Feb 80, 181p
Supersedes NTIS/PS-79/0070 and NTIS/PS-78/0009. For the companion Published Search of the NTIS Data Base, see PB80-804412.

The cited reports from a worldwide literature survey cover types of binders and adhesives, curing, and bonding techniques. Recommended procedures for bonding wood are given. The durability and mechanical properties of different type woods for the manufacture of particle boards and fiber boards are cited. Plywood bonding is excluded in this report. (This updated bibliography contains 174 abstracts, 13 of which are new entries to the previous edition.)

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A078 288/8 PC **A02/MF A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Numerical Methods and Approximation and Modelling Problems in Stochastic Control Theory.
Final rept. 1 Jul 78-30 Jun 79,
Wendell H. Fleming, and Harold J. Kushner. 15 Aug 79, 8p AFOSR-TR-79-0972
Grant AFOSR-76-3063
See also AD-A070 038.

Many areas of stochastic control were studied in this period. Monte-Carlo algorithms of type appearing in adaptive systems were studied and stability, convergence and rate of convergence results obtained. The analytical techniques developed for this purpose have a wide applicability in the study of similar algorithms. Robust computationally oriented approximations to optimal nonlinear filters were developed. A deep study of how to find the Markov system that best approximates a given non-linear system with a wide band-width input was undertaken and very good results obtained. The problem is important in control and communication theory because it is usually desired to use the many available methods for analyzing Markov systems. The results obtained seem to be the best available so far and application to control and communication theory are being pursued. Optimal stochastic control problems under the condition of partial information on the system state were studied and a new formulation, similar to that of the non-linear filtering problem, developed. The approach seems promising in providing qualitative information on this difficult class of problems. Part of the technique uses measure-valued processes in a way which has wider applicability to problems involving distributed states or information. (Author)

AD-A078 290/4 PC **A02/MF A01**
Brown Univ Providence R I Div of Applied Mathematics
Partially Observed Stochastic Control Systems.
Interim rept.,
Wendell H. Fleming, and Etienne Pardoux. 1979, 12p AFOSR-TR-79-1166
Grants AFOSR-77-3063, NSF-MCS76-07261

In this paper, the authors are concerned with the existence of optimal controls for problems. The method depends on introducing another stochastic control problem which is called a 'separated' problem. For several years the question of proving a general theorem about existence of optimal controls in the strict sense has been open. The authors do not obtain such a result here. However, they obtain an existence theorem in which a somewhat wider class of control processes is admitted.

AD-A078 330/8 PC **A03**/MF **A01**
Cornell Univ Ithaca NY School of Operations Research and Industrial Engineering
Incomplete Block Designs for Comparing Treatments with a Control. I. General Theory.
Technical rept.,
Robert E. Bechhofer, and Ajit C. Tamhane. Mar 79, 36p Rept no. TR-414
Contracts DAAG29-77-C-0003, N00014-75-C-0586
Sponsored in part by Grant NSF-ENG77-06112.
See also AD-A077 919.

This is the first paper of a series in which we outline a theory of optimal incomplete block designs for comparing several treatments with a control, and give plans of optimal designs to use for this purpose. In the present paper we develop the basic theory of the incomplete block designs which are appropriate for the many-to-one comparisons problem; the optimality considerations for such designs will be addressed in subsequent papers. For this problem we propose a new general class of incomplete block designs which are balanced with respect to test treatments. We shall use the abbreviation BTIB to refer to such designs. We study their structure, and give some methods of construction. A procedure for making exact joint confidence statements for our multiple comparisons problem is described. Using a new concept of admissibility of designs, it is shown how 'inferior' designs can be eliminated from consideration. Some open problems concerning construction of BTIB designs are posed. (Author)

AD-A078 331/6 PC **A03**/MF **A01**
Cornell Univ Ithaca NY School of Operations Research and Industrial Engineering
Incomplete Block Designs for Comparing Treatments with a Control. III. Optimal Designs for p = 4, k = 4 and p = 5, k = 3.
Technical rept.,
Robert E. Bechhofer, and Ajit C. Tamhane. Oct 79, 49p Rept no. TR-436
Contracts DAAG29-77-C-0003, N00014-75-C-0586
Sponsored in part by Grant NSF-ENG77-06112.
See also AD-A078 330.

This paper continues the study of balanced treatment incomplete block (BTIB) designs. The definitions of inadmissiblity and strong inadmissibility are generalized. The search for optimal designs is restricted to the smaller class of admissible designs obtained using these new difinitions. Lists of generator designs, the (conjectured) complete class of generator designs, catalogs of admissible designs, and tables of optimal designs are given for p = 4, k = 3 and p = 5, k = 3. (Author)

AD-A078 372/0 PC **A02**/MF **A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
On a Stochastic Control Problem with Exit Constraints.
Interim rept.,
Martin Day. Jun 79, 17p AFOSR-TR-79-1165
Grant AFOSR-76-3063

In this paper the logarithmic transformation of Fleming is used to discuss a specific problem of controlled diffusions. The problem is to minimize a certain quadratic functional of the applied drift while satisfying the requirement that the place where the process exists a domain is not in a specified subset of its boundary. The main result is that the solution of this problem is given by the logarithm of a related exit probability. (Author)

AD-A078 395/1 PC **A03**/MF **A01**
Massachusetts Inst of Tech Cambridge Artificial Intelligence Lab
Non-Monotonic Logic I. Revision.
Memorandum rept.,
Drew McDermott, and Jon Doyle. Jul 79, 38p
Rept no. AI-M-4868
Contract N00014-75-C-0643, Grant NSF-MCS77-04828
Revision of report dated Aug 78, AD-A062 813.
Prepared in cooperation with Yale Univ. New Haven, CT. Dept. of Computer Science.

'Non-montonic' logical systems are logics in which the introduction of new axioms can invalidate old theorems. Such logics are very important in modeling the beliefs of active processes which, acting in the presence of imcomplete information, must make and subsequently revise assumptions in light of new observations. We present the motivation and history of such logics. We develop and proof theories, a proof procedure, and applications for one non-monotonic logic. In particular, we prove the completeness of the non-monotonic predicate calculus and the decidability of the non-monotonic sentential calculus. (Author)

AD-A078 416/5 PC **A03**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science
Probabilistic Algorithms in Finite Fields,
Michael O. Rabin. Jan 79, 29p Rept no. MIT/LCS/TR-213
Contract N00014-75-C-0661

We present probabilistic algorithms for the problems of finding an irreducible polynomial of degree n over a finite field, finding roots of a polynomial, and factoring a polynomial into its irreducible factors over a finite field. All of these problems are of importance in algebraic coding theory, algebraic symbol manipulation, and number theory. These algorithms have a very transparent, easy to program structure. For finite fields of large characteristic p, so that exhaustive search throng z sub p is not feasible, or algorithms are of lower order in the degrees of the polynomial and fields in question, than previously published algorithms. (Author)

AD-A078 432/2 PC **A03**/MF **A01**
Brown Univ Providence RI Div of Applied Mathematics
An Example of Bifurcation to Homoclinic Orbits.
Interim rept.,
Shui-Nee Chow, Jack K. Hale, and John Mallet-Paret. 1 Sep 79, 32p AFOSR-TR-79-1240
Grants AFOSR-76-3092, NSF-MCS76-06739
Sponsored in part by Grants NSF-MCS79-05774 and DAAG27-76-G-0294.

The purpose of this paper is to determine the curves in lambda-space of bifurcation to strange attractors and to relate this to hyperbolic subharmonic bifurcations. (Author)

AD-A078 433/0 PC **A05**/MF **A01**
Northwestern Univ Evanston IL Dept of Mechanical Engineering
Optimal Control of Systems with Uncertainty.
Interim rept. Sep 78-Aug 79,
W. E. Schmitendorf. 1979, 91p AFOSR-TR-79-1257
Grant AFOSR-76-2923

The first problem considered was that of steering a system without disturbances to the origin when the magnitude of the control is constrained. A technique was developed for determining if a system can be steered to the origin and also a method for obtaining such a control when it exists. Next, the controllability problem was generalized by allowing for targets other than the origin. To reduce computational capability, a method was developed which exploits the affine nature of the target and requires the solution of a smaller dimensional optimization problem. One other area which has been under investigation is that of avoidance control. The controllability problem for systems with disturbances is being investigated. Research is also continuing on controllability of systems without disturbances. Work is also in progress on the avoidance control problem as well as the closely related holding problem. (Author)

AD-A078 464/5 PC **A02**/MF **A01**
Florida State Univ Tallahassee Dept of Statistics
Unified Treatment of some Inequalities among Ratios of Means.
Interim rept.,
Emad El-Neweihi, and Frank Proschan. Oct 79, 8p FSU-STATISTICS-M524, TR-78-101, AFOSR-TR-79-1230
Grant AFOSR-78-3678, Contract AFOSR-76-3050

Using majorization and Schur-functions, Marshall, Olkin, and Proschan obtained a result concerning monotonicity of the ratio of means. This note shows that a slight extension of their result provides a unified method for obtaining and extending inequalities between means due to Chan, Goldberg, and Gonek, as well as deriving additional inequalities of the same type. (Author)

AD-A078 474/4 PC **A03**/MF **A01**
North Carolina Univ At Chapel Hill Inst of Statistics
On the Cumulants of Cumulative Processes.
Technical rept.,
Walter L. Smith. Oct 79, 50p Rept no. MIMEO SER-1257
Contract N00014-76-C-0550

Cumulative processes were introduced in 1955 as a natural concomitant to the study of what the author called regenerative processes (Smith, 1955). In that first paper some basic results concerning cumulative processes were obtained; these were also explained, and the notions of cumulative and regenerative processes further detailed, in Smith (1956). For the purpose of the present discussion, the cumulative process is presented.

AD-A078 479/3 PC **A04**/MF **A01**
California Univ Berkeley Electronics Research Lab
No Period Two Implies Convergence, or Why Use Tangents When Secants Will Do.
Memorandum rept.,
W. Kahan. 10 Oct 79, 71p Rept no. UCB/ERL-M79/61
Contract N00014-76-C-0013

A familiar task is to solve f(x) = 0 given a continuously differentiable real function f. Newton's iteration could be tried; so could the Secant iteration. Except when the derivative f' costs appreciably less to evaluate than does f, the Secant iteration tends in practice to converge ultimately more efficiently than Newton's whenever both iterations converge to the desired root. When will they both converge. We find roughly that whenever Newton's iteration converges from every starting point in an interval I, so must the Secant iteration converge from every pair of starting points in I provided only that f actually reverses sign in I. This is an unexpected way for the Secant iteration to dominate Newton's.

AD-A078 486/8 PC **A02**/MF **A01**
Colorado Univ Boulder Dept of Electrical Engineering
Feedback System Design.
Annual rept. for year ending 31 Oct 79,
Isaac M. Horowitz. 1979, 24p AFOSR-TR-79-1238
Grant AFOSR-76-2946

In Quantitative Feedback Synthesis, bounds on plant uncertainty and on the system performance are specified apriori. The minimum feedback is used which satisfies the latter over the range of plant uncertainty. The principal effort during the past year was in extending Quantitative Feedback Synthesis to two new highly complex, multiple-loop, single input-output plant structural classes. The significant advantage of multiple-loop over single-loop is that, in highly uncertain systems, the same performance specifications can be satisfied, with tremendously smaller sensor noise effects. A technique denoted as 'Design Perspective' was developed, which enables the designer to evaluate the trade-offs without a detailed design. Thus, early in the game and before doing a detailed design, the designer can obtain an excellent idea of which loops (sensors) to use and which to omit and the portion of the 'feedback burden' to assign to each loop. The same design techniques are applicable to highly uncertain nonlinear plants with the same structure. Several complex detailed design examples with very large uncertainty were done. Design perspective results were very close to the final design results. The designs were simulated on the digital computer and in all cases satisfied the apriori assigned performance specifications.

AD-A078 487/6 PC **A02**/MF **A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Optimal Discounted Linear Control of the Wiener Process.
Interim rept.,
Ioannis Karatzas. Sep 79, 18p AFOSR-TR-79-1249

Grant AFOSR-77-3083

We consider the problem of discounted optimal control of the Wiener process, transformed by the action of a nonanticipative control into the state process. The latter satisfies the state equation on an appropriate probability space. There is a cost per unit time for being in the wrong state which is an even, uniformly convex function on the reals whose second derivative is decreasing with distance from the origin. There is also a cost per unit time for using the control. Both costs are discounted in time by a factor and the control action is limited. The controller has to choose a law as a nonanticipative, measurable functional of the state process with values so as to minimize the expected discounted total cost. In the present paper we proceed by formulating the control problem. The Bellman equation of dynamic programming is explicity solved and the candidate for the optimal law is discerned from the properties of the solutions. Optimality of the candidate is proved.

AD-A078 488/4 PC **A03/MF A01**
Massachusetts Inst of Tech Cambridge Lab for Information and Decision Systems
Some Properties of the Dual Adaptive Stochastic Control Algorithm.
Interim rept.,
Pierre Dersin, Michael Athans, and David A. Kendrick. Aug 79, 31p LIDS-P-936, AFOSR-TR-79-1254
Grant AFOSR-77-3321

The purpose of this paper is to compare analytically the properties of the suboptimal dual adaptive stochastic control algorithm when the plant dynamics contain multiplicative white noise parameters. A simple scalar example is used for this analysis. (Author)

AD-A078 489/2 PC **A03/MF A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Control of Dynamical Systems.
Interim rept. 1 Sep 78-30 Aug 79,
J. K. Hale, H. T. Banks, E. F. Infante, and J. P. LaSalle. 30 Oct 79, 33p AFOSR-TR-79-1251
Grant AFOSR-76-3092

Fifteen papers were prepared for publication or published during the ensuing period of research. Topics included identification and control of systems with delays, qualitative theory of functional differential and difference equations, nonlinear oscillations, control of dynamical systems, and stability of infinite-dimensional systems. (Author)

AD-A078 509/7 PC **A03/MF A01**
California Univ Los Angeles Dept of System Science
Countable State Average Cost Regenerative Stopping Problems.
Working paper,
Bruce L. Miller. Apr 79, 31p Rept no. UCLA-WP-288
Contract N00014-76-A-0004, Grant NSF-ENG76-12250

Regenerative stopping problems are stopping problems which recommence from the initial state upon stopping. An algorithm is presented which solves a semi-Markov regenerative stopping problem with a finite number of continue actions by solving a sequence of stopping problems. New results for the optimal stopping problem are obtained as well as for the regenerative stopping problem. Two models in the literature are used as detailed examples of the algorithm. (Author)

AD-A078 510/5 PC **A02/MF A01**
California Univ Los Angeles Dept of System Science
Optimal Investigation as a Regenerative Stopping Problem.
Working paper,
A. Gregory Buckman, and Bruce L. Miller. May 79, 25p Rept no. UCLA-WP-289
Contract N00014-78-C-0428, Grant NSF-ENG76-12250

This report discuss the problem of dynamic optimal investigation of a two-state (in control, out of control) system. The true state can only be inferred from reported costs and the time since the last correction. It is demonstrated that when the parameters satisfy certain conditions, such problems can be efficiently solved as regenerative stopping problems. Some general results for regenerative stopping problems are also obtained. In the last section the problem is generalized to n two-state systems. By combining simulation with the Regenerative Stopping Algorithm, a problem with 20 state variables is solved with a small error term. (Author)

AD-A078 534/5 PC **A02/MF A01**
University of Southern California Los Angeles Dept of Aerospace Engineering
New Methods for Analysis of the Performance of Guidance and Control Systems.
Annual interim rept. 1 Oct 78-30 Sep 79,
Richard S. Bucy. Sep 79, 3p AFOSR-TR-79-1152
Grant AFOSR-76-3100

The investigation has continued in the use of information theory and in particular rate distortion theory to derive useable upper and lower bounds on the expected loss for the nonlinear filtering problem. A new design criterion has been derived which leads to effective designs of large systems when the entire state is not available for feedback control. Preliminary results have been obtained on the problem of absolute phase demodulation. New results which evaluate the information loss which results from use of the classical phase lock loop instead of the optimal demodulator, have been obtained and are being investigated. (Author)

AD-A078 583/2 PC **A03/MF A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
On the Weak Convergence of a Sequence of General Stochastic Difference Equations to a Diffusion,
H. J. Kushner, and Hai Huang. Oct 79, 36p Rept no. LCDS-TR-79-6
Contract N00014-76-C-0279, Grant AFOSR-77-3063
Sponsored in part by Grant NSF-ENG77-12946.

A convenient and useful method for showing weak convergence, to a diffusion, of the interpolated solutions of a (not necessarily Markovian) sequence of stochastic difference equations is developed. The technique involves the use of averaging methods to show that the weak limit satisfies the martingale problem of Strook and Varadhan which is associated with the diffusion. A truncation method is developed so that it is only necessary to work with the parts of the process before first escape from an arbitrary but bounded domain. The assumptions cover a wide variety of applications in systems theory, mathematical biology and elsewhere but the method of proof is adaptable to other special cases where our particular assumptions might not hold. Two applications are given in order to illustrate the relative ease of use of the method. The driving noise process in the difference equations can depend on the solution process of the difference equation, and one application where this is useful is given (a rate of convergence problem for simple stochastic approximations with sequentially averaged observations). (Author)

AD-A078 597/2 PC **A02/MF A01**
North Carolina Univ At Chapel Hill Dept of Statistics
Nonlinear Systems with Gaussian Inputs: Representation, Identification and Inverse Problems.
Interim rept.,
Stamatis Cambanis. 1979, 4p AFOSR-TR-79-1212
Grant AFOSR-75-2796

The following questions are discussed for nonlinear systems with input Gaussian processes. How can the system be represented. How can the system be identified from the input and output processes. Does knowledge of the way the system responds to a certain Gaussian input determine the way it will respond to another Gaussian input or to a deterministic input. Does knowledge of the system and the statistics of the output determine the statistics of the input. (Author)

AD-A078 602/0 PC **A02/MF A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
A Projected Stochastic Approximation Method for Adaptive Filters and Identifiers.
Interim rept.,
Harold J. Kushner. 22 Aug 79, 15p AFOSR-TR-79-1250
Contract N00014-76-C-0279, Grant AFOSR-77-3063
Sponsored in part by Grant NSF-ENG77-12946.

This report deals with a great variety of stochastic approximation procedures, for constrained and unconstrained systems and for convergence w.p.1. and weak convergence, all for systems with correlated inputs. The techniques are readily usable for many problems that are not explicitly treated there. This will be illustrated here for one particular class of constrained problems which is of great current interest and which arises in identification and in adaptive control theory. In fact, it is just such constrained problems to which more attention should be given, owing to their prevalence. The proofs are contained in various parts and, after the problem is defined, it is shown how to put the bits and pieces together. The problem and method are typical of a large class of adaptive systems which can be treated by similar methods, and is worth singling out.

AD-A078 640/0 PC **A02/MF A01**
Texas Univ At Austin
Smoothing and Approximation of Multivariate Functions.
Final rept. 10 Sep 77-9 Sep 79,
E. W. Cheney. 31 Oct 79, 10p ARO-14900.9-M
Contract DAAG29-77-G-0215

The goal of the research project was to proceed as far as possible in the study of a certain class of practical approximation problems. Namely, the problem is to reduce the complexity of multivariate functions by representing them precisely or approximately by combinations of univariate functions. A prototype problem is that of finding a best approximation to a function of two variables, $F(x,Y)$, by a sum $g(x) + H(y)$. The prototype problem is thoroughly understood in the case that the functions involved are continuous and an approximation in the uniform sense is needed.

AD-A078 688/9 PC **A02/MF A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Stability from the Bifurcation Function.
Interim rept.,
Jack K. Hale. 11 Oct 79, 13p AFOSR-TR-79-1248
Grants AFOSR-76-3092, DAAG27-76-G-0294
Sponsored in part by Grant NSF-MCS79-05774.

This paper contains an extension to C superscript k -vector fields of the classical results of Liapunov on the stability of an equilibrium point in the critical case of one zero root. The transformation theory of Liapunov is not applicable to this case. We exploit fundamental relations from bifurcation theory. (Author)

AD-A078 689/7 PC **A02/MF A01**
Brown Univ Providence R I Lefschetz Center for Dynamical Systems
Remarks on Bifurcation Theory in Differential Equations.
Interim rept.,
Jack K. Hale. 1979, 13p AFOSR-TR-79-1247
Grants AFOSR-76-3092, DAAG27-76-G-0294
Sponsored in part by Grant NSF-MCS79-05774.

This paper discusses primarily the idea of genericity in bifurcation theory for one and two parameter problems. Recent results on homoclinic points are mentioned as well as a connection between the bifurcation function and dynamic behavior. (Author)

AD-A078 715/0 PC **A02/MF A01**
Florida Univ Gainesville Center for Mathematical System Theory
Mathematical Techniques for Nonlinear System Theory.
Annual rept.,
R. E. Kalman, and E. Emre. May 79, 2p AFOSR-TR-79-1255
Grant AFOSR-76-3034

The main topic of research concerned various algebraic characterizations of F mod G invariant

subspaces in linear systems. Module-theoretic characterizations of these subspaces were obtained which showed among other results, that a module structure can be defined maximally on the ratio of V to R where V is the maximal F mod G invariant subspace contained in the Kernal of H and R is the analogous maximal reachability subspace. A final solution of the so-called partial realization problem was obtained. (Author)

AD-A078 749/9 PC **A03**/MF **A01**
Kentucky Univ Lexington Dept of Mathematics
Realization Theory for Multivariate Gaussian Processes II: State Space Theory Revisited and Dynamical Representations of Finite Dimensional.
Interim rept.,
Anders Lindquist, and Giorgio Picci. Jul 79, 30p
AFOSR-TR-79-1275
Grants AFOSR-78-3519, NSF-ENG79-03731
See also Part 1, AD-A069 072. Presented at the International Conference on Information Sciences and Systems (2nd), 9-14 Jul 79, Patras, Greece.

The purpose of this paper is twofold. First, some of the results of Part I are generalized and clarified, reformulated in a mathematical framework which we now perceive as more natural and conceptually sounder, the basic concept being perpendicularly intersecting subspaces. By relating minimality of stochastic realizations to the factorization of certain Hankel operators, the connections to deterministic realization theory is further clarified. Furthermore, spectral domain criteria for minimality, observability and constructibility are presented. Secondly, stochastic differential equation representations are presented for all state spaces which are finite dimensional. The infinite dimensional case will be the topic of Part III of this sequence of papers. (Author)

AD-A078 751/5 PC **A03**/MF **A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Design of Optimal Tracking Discrete Control System.
Interim rept.,
Y. Bar-Ness, and J. Feinstein. Jul 79, 44p
AFOSR-TR-79-1284
Grant AFOSR-77-3063

Output feedback with a series compensator is considered for controlling SISO discrete systems. MSE criterion of design is used in tracking a given input sequence. The plant can be unstable and/or nonminimum phase, while the compensator is constrained to be physically realizable and closed-loop configuration is both stable and physically realizable. Using variational methods the required compensator is found, and shown to be the necessary and sufficient optimal solution. (Author)

AD-A078 774/7 PC **A02**/MF **A01**
Florida State Univ Tallahassee Dept of Statistics
The Extreme Points of the Set of Decreasing Failure Rate Distributions.
Interim rept.,
Naftali A. Langberg, Ramon V. Leon, James Lynch, and Frank Proschan. Aug 79, 18p FSU-STATISTICS-M484-REV, TR-78-5-REV, AFOSR-TR-79-1219
Grants AFOSR-78-3678, NSF-MCS79-04698
Supersedes report dated Nov 78, AD-A064 786.

Since the class of extended decreasing failure rate (EDFR) life distributions (i.e., distributions with support in (0, infinity)) is compact and convex, it follows from Choquet's Theorem that every EDFR life distribution can be represented as a mixture of extreme points of the EDFR class. We identify the extreme points of this class and of the standard class of decreasing failure rate (DFR) life distributions. Further, we show that even though the convex class of DFR life distributions is not compact, every DFR life distribution can be represented as a mixture of extreme points of the DFR class. (Author)

AD-A078 815/8 PC **A02**/MF **A01**
Control Dynamics Co Huntsville AL
Application of Digital Technology to Guidance and Control Theory.
Technical rept. 1 Aug-30 Sep 79,
S. M. Seltzer. 30 Sep 79, 20p Rept no. CDC-79-3
Contract DAAK40-79-C-0213

The purpose of the study reported upon herein is to investigate the potential existence of a clustering of system poles and zeros in the z-domain. This potential is shown to exist. A means of separating the clustering is proposed by mapping from the complex z-domain onto the complex w-domain. The reason for so-doing is to ameliorate computational difficulties that can arise as the result of closely clustered roots. (Author)

AD-A078 853/9 PC **A02**/MF **A01**
California Univ Los Angeles Dept of Mathematics
Problem in Stability Analysis of Finite Difference Schemes for Hyperbolic Systems.
Interim rept. 6 Jan 78-31 May 79,
Moshe Goldberg. 1979, 6p AFOSR-TR-79-1285
Grant AFOSR-76-3046

The research consists mainly of generalizing previous work to obtain new, easily checkable stability criteria for general, dissipative or nondissipative, explicit or implicit difference approximations to hyperbolic mixed initial-boundary value problems. The criteria obtained are independent of the basic scheme and are given solely in terms of the boundary conditions; thus they are significantly more convenient than traditional criteria. The results imply that many well known boundary conditions, when used in combination with arbitrary dissipative or nondissipative schemes, always maintain stability.

AD-A078 941/2 PC **A04**/MF **A01**
University of Southern California Los Angeles Social Science Research Inst
Rank Weighting in Multiattribute Utility Decision Making: Avoiding the Pitfalls of Equal Weights.
Technical rept. Dec 78-Dec 79,
William G. Stillwell, and Ward Edwards. Sep 79, 52p Rept nos. USC-001595-2T, SSRI-RR-79-2
Contract N00014-79-C-0038

The notion of 'dominance' in multiattribute utility decision contexts leads to a change in the considered alternative set. The implications of this set change are discussed in relation to the conditions of Wainer's (Wainer, 1976) 'equal weights theorem' and the resulting sensitivity to weighting of importance dimensions demonstrated. Data from three multiattribute decision making studies are examined using four rank weighting techniques as well as equal weights. Rank weighting of importance dimensions demonstrate marked improvement of approximation as reflected in both Pearson and rank order correlations for measures of overall utility across alternatives within the nondominated subset. Implications for multiattribute utility application are discussed. (Author)

AD-A078 948/7 PC **A02**/MF **A01**
Michigan State Univ East Lansing Dept of Statistics and Probability
The Asymptotic Distribution of Mortality Rates in Competing Risks Analyses.
Joseph C. Gardiner. Dec 79, 16p Rept no. RM-405
Contract N00014-79-C-0522, Grant PHS-BSRG-S07-RR07049-14

For a sample of individuals from an animal or human population under observation in a clinical trial or life test, mortality rates are defined for each risk to which the population is exposed. By considering only the crude risk functions and cause-specific failure rates in a basic competing risks model, these mortality rates are shown to have an asymptotic normal distribution. An expression for the asymptotic correlation between a pair of mortality rates is thus obtained and a necessary and sufficient condition for their asymptotic independence is investigated in some general situations with reference to only the cause-specific failure rates and the survival function of the individuals. (Author)

AD-A078 959/4 MF **A01**
Princeton Univ NJ Dept of Statistics
An Implicit Function Theorem for Group Equations Generated by a Finite Automaton.
Technical rept.,
Philip R. Thrift. Aug 79, 9p Rept no. TR-150-SER-2
Contract N00014-79-C-0322
Availability: Microfiche copies only.

The study of mathematical semantics involves the study of mappings from a formal language L to a configuration space C. In this paper we consider the special case where L = L(D), D is a finite automaton, C is a group G, and the semantic map is defined by associating each production of D with a group element of G, p approaches theta (P). A sequence of productions would then be mapped to a product of corresponding group elements. When the semantic map is observed on sentences in L(D), we discuss a graph-theoretic method of solving for theta. (Author)

AD-A078 960/2 PC **A03**/MF **A01**
Princeton Univ NJ Dept of Statistics
Asymptotic Inference for Eigenvectors.
Technical rept.,
David E. Tyler. Oct 79, 27p Rept no. TR-157-SER-2
Contracts N00014-67-A-0151-0017, N00014-75-C-0453
Sponsored in part by Grant DAHC04-74-G-0178 and ERDA-E-111-2310.

Asymptotic procedures are given for testing certain hypotheses concerning eigenvectors and for constructing confidence regions for eigenvectors. These asymptotic procedures are derived under fairly general conditions on the estimates of the matrix whose eigenvectors are of interest. Applications of the general results to principal components analysis and canonical variate analysis are given. (Author)

N80-14137/7 PC **A09**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Linear Systems Analysis Program, L224(QR). Volume 1: Engineering and Usage.
Topical Report, Apr. 1978 - Oct. 1979.
P. C. Shah, and K. W. Heidergott. Dec 79, 180p
NASA-CR-2861
Contracts NAS1-15346, BCS-G0061

The QR computer program is described as well as its use in classical control systems analysis and synthesis (root locus, time response, and frequency response).

N80-14781/2 PC **A03**/MF **A01**
Gesellschaft fuer Mathematik und Datenverarbeitung, Bonn (Germany, F.R.). Inst. fuer Mathematik.
Modular Programs for the Fast Solving of Linear Elliptic Equations by Reduction Methods: TR2D01, TR2D02 to Solve the Dirichlet Problem for Helmholtz Equation; User's Manual Concerning the Club Modulef.
H. Foerster. 1978, 27p GMD-MITT-47

The modular programs TR2D01 and TR2D02 are described. Both modules can be used to solve the Helmholtz equation of a rectangle with Dirichlet's boundary conditions where the given problem is approximated by a system of linear equations. To this system the method of total reduction by Schroder and Trottenberg is applied. The data structure out is generated to contain the solution of the discrete boundary value problem. The difference between module TR2D01 and module TR2D02 lies in the discretization. Making use of a five point formula gives order 2 in TR2D01, while a nine point formula yields order 4 in TR2D02. This manual is a modified version of a preprint. The modifications concern the terminology and the programming conventions of the Club MODULEF (IRIA/LABORIA, Paris). These conventions, especially the program and data structures, are supposed to be known.

N80-14804/2 PC **A02**/MF **A01**
Orange Free State Univ., Bloemfontein (South Africa). Dept. of Mathematical Statistics.
The Asymptotic Expansion of the Stein Estimator for the Matrix Case with Covariance Matrix sigma Hyperon Unknown.
A. J. Vandermerwe, and O. G. Nel. Mar 79, 14p
TR-41
Subm-Sponsored by Csir and Uofs Res. Fund.

The method used to determine the existence of estimators which dominate the maximum likelihood estimators for the problem of simultaneously estimating the means of three or more random var-

iables was extended from the vector case to the matrix case. The asymptotic distribution, mean and variance of the Stein estimator was derived as well as that of the quadratic loss function for the matrix case with covariance matrix Sigma unknown.

N80-14806/7 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa). Operations Research and Statistical Div.
Finding the Root of a Monotonic Function.
D. M. Hawkins, and J. S. Galpin. Mar 79, 12p CSIR-TWISK-75
Subm-Sponsored in Part by Control Data.

A FORTRAN algorithm is presented for solving the equation F(x) = y sub 0 where F is continuous and strictly monotonic. The algorithm is a generalization of the secant method, uses no derivatives, and is fast and stable.

N80-14808/3 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
A New Test for Multivariate Normality and Homoscedasticity.
D. M. Hawkins. Sep 78, 17p CSIR-TWISK-45

Given data X sub ij j=1 to n sub i i=1 to g, a test was performed to determine whether the X sub ij are normal with common covariance matrix. Letting X sub i denote the mean of the i-th group and S the pooled covariance matrix, the quantities V sub ij = (X sub ij-X sub i) prime 1/S (X sub ij-X sub i) are used in the test. The exact null distribution of V sub ij is noted, and the Anderson-Darling statistic proposed for testing whether the data fit this null distribution. The test has several advantages over the tests currently being used.

N80-14809/1 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Limits and Adjoint Situations in Mathematical Structures.
G. Naude. Mar 79, 20p CSIR-TWISK-67

Category theory is considered as a unifying language for various branches of mathematics. The concepts 'limit' and 'adjoint functor', as well as their duals, are introduced in a heuristic manner. The particular importance of the preservation of limits is stressed, and examples are given of adjoint functors found in algebra, topology and analysis. Finally various adjoint functors in categorical systems theory are discussed.

N80-14810/9 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Indicating Cones and the Intersection Principle for Tangential Approximants in Abstract Multiplier Rules.
D. H. Martin, R. J. Gardner, and G. G. Watkins. Feb 79, 32p CSIR-TWISK-68
Subm-Sponsored in Part by Control Data.

A partial ordering is established by generality among several specific notions of tangential approximation in the literature. The theory is unified through the introduction of an indicating cone. For solid cones, all notions of tangential approximant considered coincide.

N80-14812/5 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Optimal Steering of a Random Motion of a Point Mass.
Y. Yavin, and A. Jordan. Mar 79, 23p CSIR-TWISK-71
Subm-Supported in Part by Control Data.

A stochastic system is introduced representing the kinetics of a two dimensional random motion of a point mass. The point mass velocity is subjected to two different kinds of perturbations, the first represented by a vector of independent standard Wiener processes and the second by a vector of a generalized type of Poisson process. The control function is theta while v is kept fixed. The problem discussed is aimed at finding an optimal control law theta*= theta*(x), such that the point mass will reach a given target set in such a manner that the expected duration of its motion will be minimized and its probability of reaching the target set maximized. Sufficient conditions on optimal controls, of a dynamic programming type, are derived. These conditions require the existence of a smooth solution to a nonlinear partial integro-differential equations, which is solved here by applying a finite differences scheme. Numerical examples indicate that in many cases the line-of-sight control law can serve as a good approximation to an optimal control law.

N80-14813/3 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Computation of Moments of Functionals of a Solution to a Stochastic Differential Equation.
Y. Yavin, and W. C. Huisman. Mar 79, 32p CSIR-TWISK-73

A set of partial integro-differential equations for the computation of E sub x (z(x;v) to the k power, k = 1,2,...., is derived. A nonlinear stochastic second order system is given as a test case and two finite difference algorithms for the computation of E sub x (x(x;v*)) to the k power, k = 1,2,...., are suggested, where v* is a control law that maximizes E sub x z(x;v) on a class U of admissible controls. It is shown numerically that for L(x) = 1 there is a significant increase in the values of E sub x (z(x;v)) to the k power and m sub k (x;v) in comparison with the corresponding values of E sub x (z(x;0) to the k power and m sub k (x;0), when E sub x z(x;v) is maximized on U for k = 2,....5 at least.

N80-14814/1 PC **A04**/MF **A01**
Brown Univ., Providence, RI. Div. of Applied Mathematics.
Approximate and Exact Numerical Integration of the Gas Dynamic Equations.
T. S. Lewis, and L. Sirovich. 1979, 57p NASA-CR-162554
Grant NSG-1617

A highly accurate approximation and a rapidly convergent numerical procedure are developed for two dimensional steady supersonic flow over an airfoil. Examples are given for a symmetric airfoil over a range of Mach numbers. Several interesting features are found in the calculation of the tail shock and the flow behind the airfoil.

N80-14816/6 PC **A03**/MF **A01**
Old Dominion Univ. Research Foundation, Norfolk, VA.
Integrating Matrices for Arbitrarily Spaced Grid Points.
Final Report, 30 May - 30 Aug. 1979.
W. D. Lakin. Nov 79, 33p NASA-CR-159172
Contract NAS1-15648

Integrating matrices are derived for arbitrarily spaced grid points using either interpolating or least squares fit orthogonal polynomials. Several features of the equally spaced grid case are also discussed.

N80-14819/0 PC **A05**/MF **A01**
European Space Agency, Paris (France).
Field Computation by the Geometrical Theory of Diffraction.
A. Schrott. May 79, 94p ESA-TT-594, DFVLR-FB-78-06
Tran-Transl. Into English of 'Feldberechnungen MIT Hilfe der Geometrischen Beugungstheorie', Dfvlr, Oberpfaffenhofen, West Ger. Report Dfvlr-FB-78-06, 16 Jun. 1978. Misc-Original German Report Available from Dfvlr, Cologne Dm 33,00.

The canonical problems of diffraction by a convex surface and the diffraction by a wire, which are of great practical interest, are treated. The first case is treated for the source placed away from and on the surface. For the illuminated region, the shadow region and the transition region separate solutions are derived. The problem of the field computation at caustics is investigated in detail for a circular edge. Applying the concept of the so called equivalent edge currents caustic correction factors for the field of the geometrical theory of diffraction at caustics are derived.

N80-14828/1 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Optimal Controls That Maximize the Probability of Hitting a Set of Targets: A Numerical Study.
Y. Yavin, and A. M. Jordan. May 79, 39p CSIR-TWISK-81
Subm-Supported in Part by Control Data.

An optimal control law to be maximized on a given class of admissible control laws is discussed. Sufficient conditions on optimal controls, of a dynamic programming type, are derived. These conditions which require the existence of a smooth solution to a nonlinear partial integro-differential equation, is solved by applying a finite difference scheme. Two examples are dealt with numerically.

N80-14833/1 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Results and Conjectures on Covering Metric Spaces.
R. J. Gardner. Feb 79, 15p CSIR-TWISK-70

A semiquantitative theory of covering metric spaces is studied. General results are obtained on fine covers, and are put forth. Most of these remain unanswered for subsets of the real line.

PB80-124571
(Order as PB80-124548, PC **A05**/MF **A01**)
Cincinnati Univ., OH. Dept. of Mathematics.
Exact Coefficients of the Limit Cycle in Van der Pol's Equation,
Andre Deprit, and Dieter S. Schmidt. 30 Mar 79, 6p
Included in Jnl. of Research of the National Bureau of Standards, v84 n4 p293-297, Jul-Aug 79.

A program generator to manipulate automatically Poisson series over the field of rational numbers is applied to develop the limit cycle of Van der Pol's equation in the powers of the small parameter. The results indicate that the recurrence relations in what Melvin calls the algorithm of the shifted phase are stable.

PB80-126188 PC **A03**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Pseudoreplication Further Evaluation and Application of the Balanced Half-Sample Technique.
Vital and health statistics series,
Philip J. McCarthy. Jan 69, 34p VHS/SER-2/31, DHEW/PUB/HSM-73/1270
Library of Congress catalog card no. 68-62232.

The report introduces a pseudoreplication procedure, called balanced half-sample replication, a basis for statistical analysis when dealing with data derived from complex sample designs and estimation processes. It appeared particularly suited for variance estimation in connection with the commonly used multistage design of two primary units per stratum, with the individual observations being subjected to various kinds of ration and poststratification adjustments.

PB80-132616 PC **A09**/MF **A01**
Kansas Univ., Lawrence. Dept. of Mechanical Engineering.
An Improved Monte Carlo Procedure for the Solution of the Steady-State, Two-Dimensional Diffusion Equation with Application to Flow through Porous Media.
Master's thesis,
James H. Turner. 1979, 197p W80-02607, OWRT-B-045-KAN(2)
Contract DI-14-34-0001-6079

Monte Carlo procedures for solving the diffusion equation of heat conduction and flow through porous media have been known for some years. Various investigators have indicated that the so-called floating random walk Monte Carlo procedure offers advantages in terms of computer execution time for single point solutions and complex geometries over finite difference procedures. This work investigates an improvement to the floating random walk. The improvement is based upon the use of exact analytical solutions to the diffusion equation interpreted in probabilistic form. The results indicate that the improved Monte Carlo procedure is more efficient than the conventional Monte Carlo procedure in terms of computer ex-

ecution time and is competitive with, and may even be superior to, the ADI finite difference procedure in some cases.

PB80-133002 Mag Tape $900.00
DUALabs., Arlington, VA.
CENTS-AID 2.6.
Software,
Rebecca Hutchins, and Deirdre Gaquin. 1979, mag tape NTIS/DF-80/002
Supersedes rept. no. NTIS/DF-77/002, PB-264 552.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-133028, and PB80-133010.

CENTS-AID II is a high-speed cross-tabulation system that enables a researcher to examine and display simple frequency counts and complex cross-tabulation of up to 8-dimensions. Data stored in the following formats is accepted; BCD, EBCDIC, Binary and Packed Decimal. Variable length and hierarchical data files can be processed. There are virtually no limitations to the number of frequency counts and tables that can be processed in a single run. Includes a powerful retrieval language and a full set of data transformation and recode capabilities that can be directed at any table or set of tables requested. System automatically formats row and column headings using the descriptive labels of variables and values provided by the user. User has optional control over the formatting of tables and can specify unique column and row labels for each variable included in a table. Available on tape with a Programmer's Notebook, User's Manual, and a full year of free maintenance...Software Description: The program is written in the American National Standard COBOL (ANS-COBOL) and has been compiled and tested using NASV3 and ANSV4 of the compiler. The system is fully operational on the IBM 360/370 /3033 operating under os/MVS/MVT/VS and well as, DOS-VS. Minimum core storage requirement is 168K bytes.

PB80-133010 PC$11.75/MF$11.75
DUALabs., Arlington, VA.
CENTS-AID 2.6 User Manual.
Final rept.
c1979, 242p NTIS/DF-80/002A
Supersedes rept. no. NTIS/DF-75/003C, PB-251 633. For system on magnetic tape, see PB80-133002. See also PB80-133028.

The CENTS-AID 2.6 User Manual explains in detail how to use the CENTS-AID 2.6 Software Package. CENTS-AID 2.6 is a high speed cross-tabulation system that enables a researcher to examine and display simple frequency counts and complex cross-tabulation of up to 8 dimensions. Data stored in the following formats is accepted: BCD, EBCDIC, Binary and Packed Decimal. Variable length and hierarchical data files can be processed. Includes a powerful retrieval language and a full set of data transformation and recode capabilities that can be directed at any table or set of tables requested. System automatically formats row and column headings using the descriptive labels of variables and values provided by the user.

PB80-133028 PC$4.50/MF$4.50
DUALabs., Arlington, VA.
CENTS-AID 2.6 Programmer's Notebook.
Final rept.
Nov 79, 24p NTIS/DF-80/002B
Supersedes rept. no. NTIS/DF-77/002A, PB-264 553. For system on magnetic tape, see PB80-133002. See also PB80-133010.

The CENTS-AID 2.6 Programmer's Notebook explains in detail how to use the CENTS-AID 2.6 Software Package. CENTS-AID 2.6 is a high speed cross-tabulation system that enables a researcher to examine and display simple frequency counts and complex cross-tabulations of up to 8 dimensions. Data stored in the following formats is accepted: BCD, EBCDIC, Binary and Packed Decimal. Variable length and hierarchical data files can be processed. Includes a powerful retrieval language and a full set of data transformation and recode capabilities that can be directed at any table or set of tables requested. System automatically formats row and column headings using the descriptive labels of variables and values provided by the user.

PB80-804396 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Time Series Forecasting and Prediction (Citations from the NTIS Data Base).
Rept. for 1964-Jan 80,
Jack E. Jones. Feb 80, 195p
Supersedes NTIS/PS-79/0081, NTIS/PS-78/0022 and NTIS/PS-77/0042.

Studies on the use of time series analysis in predicting and forecasting various events are presented. The bibliography includes both specific applications and general theory studies. (This updated bibliography contains 188 abstracts, 16 of which are new entries to the previous edition.)

12B. Operations Research

AD-A078 459/5 PC A02/MF A01
Rice Univ Houston TX Dept of Mechanical Engineering
Modifications and Alternatives to the Cubic Interpolation Process for One-Dimensional Search,
A. Miele, F. Bonardo, and S. Gonzalez. 27 Feb 78, 11p AFOSR-TR-79-1148
Grants AFOSR-76-3075, NSF-MCS76-21657
Pub. in the Arabian Jnl. for Science and Engineering, v4 n2 p121-128 1979. Abstract in Arabic.

No abstract available.

AD-A078 514/7 PC A03/MF A01
Carnegie-Mellon Univ Pittsburgh PA Management Sciences Research Group
A Hybrid Method for the Solution of some Multi-Commodity Spatial Equilibrium Problems.
Management sciences research rept.,
Jong-Shi Pang. Nov 79, 28p Rept nos. MSRR-450, WP-35-79-80
Contract N00014-75-C-0621

A unified formulation of the multi-commodity transportation and transshipment spatial equilibrium models has been devised as a linear complementarity problem with certain block structure. It is shown that a block successive overrelaxation method is applicable for solving the resulting complementarity problem. The method consists of solving a sequence of subproblems of the single-commodity type. These subproblems are to be solved by a special-purpose principal pivoting algorithm developed in an earlier paper. Computational experience of solving some fairly large problems by the proposed hybird method is presented.

AD-A078 622/8 PC A02/MF A01
Texas Univ At Austin Center for Cybernetic Studies
A Linear Programming Approach to a Simple Linear Regression Problem with Least Absolute Value Criterion.
Research rept.,
R. D. Armstrong, and M. T. Kung. Sep 79, 15p Rept no. CCS-351
Contracts N00014-75-C-0616, N00014-75-C-0569

This paper presents a linear programming approach to solve simple linear regression problems with the least absolute value criterion. The solution technique uses linear programming with an extended minimum ratio rule. A computational study indicates the efficiency of the algorithm. (Author)

AD-A078 623/6 PC A03/MF A01
Texas Univ At Austin Center for Cybernetic Studies
A Dual Method for Discrete Chebychev Curve Fitting with Linear Restrictions on the Parameters.
Research rept.,
Ronald D. Armstrong, and Michael G. Sklar. Sep 79, 48p Rept no. CCS-352
Contract N00014-75-C-0569

The L at infinity norm has been widely studied as a criterion for curve fitting problems. This paper presents an algorithm to solve discrete approximation problems in the L at infinity norm when the parameters are restricted by linear constraints. The algorithm is a special-purpose linear programming dual method which employs a reduced bases and multiple pivots. Results of the computational experience with a computer code version of the algorithm are presented. (Author

AD-A078 713/5 PC A04/MF A01
Stanford Univ CA Systems Optimization Lab
Conjugate-Gradient Methods for Large-Scale Nonlinear Optimization.
Technical rept.,
Philip E. Gill, and Walter Murray. Oct 79, 64p
SOL-79-15, ARO-16470.1-M
Contracts DAAG29-79-C-0110, DE-AS03-76-SF00326
Sponsored in part by Grants NSF-MCS76-20019 and NSF-ENG77-06761.

In this paper we discuss several recent conjugate-gradient type methods for solving large-scale nonlinear optimization problems. We demonstrate how the performance of these methods can be significantly improved by careful implementation. A method based upon iterative preconditioning will be suggested which performs reasonably efficiently on a wide variety of significant test problems. Our results indicate that nonlinear conjugate-gradient methods behave in a similar way to conjugate-gradient methods for the solution of systems of linear equations. These methods work best on problems whose Hessian matrices have sets of clustered eigenvalues. On more general problems, however, even the best method may require a prohibitively large number of iterations. We present numerical evidence that indicates that the use of theoretical analysis to predict the performance of algorithms on general problems is not straightforward. (Author)

AD-A078 739/0 PC A02/MF A01
Texas Univ At Austin Center for Cybernetic Studies
On a Class of Goal Programming Models for a Single Firm.
Research rept.,
A. Charnes, and Sten Thore. Oct 79, 13p Rept no. CCS-353
Contract N00014-75-C-0569

It is shown that for a broad class of goal programming problems for a single firm and goal programming formulation is identical to the imposition of a fictitious system of excise taxes or subsidies levied on the outputs and inputs of the firm. (Author)

AD-A078 824/0 PC A06/MF A01
California Univ Berkeley Operations Research Center
Optimal State Detection Policies for Coherent Systems.
Research rept.,
Yosi Ben-Dov. Nov 77, 103p Rept no. ORC-77-30
Contract N00014-75-C-0781, Grant AFOSR-77-3179

The problem of minimizing the expected cost of identifying the state of a coherent system (as functioning or failed) is considered. The system is composed of components, and only individual components can be tested. Efficient algorithms are presented for some special cases of coherent systems: series, parallel, parallel-series, series-parallel and k-out-of-n systems. The concept of the Importance of Components is used to develop a branch and bound algorithm which determines the optimal testing procedure for any general coherent system. However this algorithm is not always efficient in solving this problem. Some other closely related problems are discussed, such as how to identify the state of a system which is represented as a fault tree, or how to identify the failed components when the system is known to be failed.

AD-A078 826/5 PC A03/MF A01
California Univ Berkeley Operations Research Center
Asymptotic Measures of System Performance under Alternative Operating Rules. I.
Research rept.,
Richard E. Barlow, and Esther Sid Hudes. Jun 79, 44p Rept no. ORC-79-6

Grant AFOSR-77-3179
See also AD-A078 827.

This is the first part of a study of stochastic processes generated by failures and repairs of components in a series system. Selected asymptotic measures of system performance are calculated for a two component series system where failure of component 1 shuts off component 2 but not vice versa. Intuitively, it is best to shut off an operating component when the system is down. However, this is not correct if the component failure distribution is IFR (or more generally NBUE) and we wish to maximize the long run average of system uptimes. Part 2 uses the method of supplementary variables to obtain explicit results for important special cases. (Author)

AD-A078 827/3 PC **A03**/MF **A01**
California Univ Berkeley Operations Research Center
Asymptotic Measures of System Performance under Alternative Operating Rules. II.
Research rept.,
Richard E. Barlow, and Esther Sid Hudes. Jun 79, 28p Rept no. ORC-79-7
Grant AFOSR-77-3179
See also AD-A078 826.

This is the second part of a study of stochastic processes generated by failures and repairs of components in a series system. In particular, we consider a two component series system where failure of component 1 shuts off component 2 but not vice versa. In Part I, selected measures of system performance were calculated for general failure and repair distributions as implicit functions of system availability. In order to obtain explicit results, we assume in this part that either component 1 or component 2 has exponential failure and repair distributions. For the case where component 1 has a general failure distribution, we obtain counter-intuitive results concerning the long run average of system uptimes. Intuitively, it is best to shut off an operating component when the system is down. However, this is not correct if the component failure distribution is IFR (or more generally NBUE) and we wish to maximize the long run average of system uptimes. We use the method of supplementary variables to obtain explicit results for important special cases. (Author)

N80-14811/7 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Global Saddle-Point Theorems Involving Conjugate-Like Operators, for General and Quasi-Concave Programs.
J. Flachs. Mar 79, 36p CSIR-TWISK-72
Subm-Sponsored in Part by Control Data.

General and quasi-concave nondifferentiable cases of the maximization problem are considered. With the aid of duality theory for mathematical programming involving conjugate-like operators, a bifunction that generates a class of perturbations is defined. Saddle-point theorems are presented, and equivalence is proved between the existence of a saddle-point and the existence of a certain cone-supporting property of the perturbation function. Possible improvements are suggested in multiplier methods.

N80-14830/7 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Two-Target Pursuit-Evasion Differential Games in the Plane.
W. M. Getz, and M. Pachter. Mar 79, 30p CSIR-TWISK-74
Subm-Supported in Part by Control Data.

Two-target versions of the two cars game and the homicidal chauffeur game are introduced. A generic example of the two-target homicidal chauffeur game is considered in detail and maps of the game and its corresponding winning strategies are found using Lyapunov methods of analysis. The effects of altering the speed and maneuverability ratios and the weapon system parameters are presented. It is found that certain winning strategies include a swerve type maneuver and that for certain sets of parameters, regions of 'stagnation' and different modes of draw occur.

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A078 619/4 PC **A02**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme CA
Intelligent Lighting Control Principles.
Rept. for Oct 78-Apr 79,
William Pierpoint. Jul 79, 24p Rept no. CEL-TN-1558

It is generally recognized that compared to illumination from ceiling-mounted electric lighting, an equal amount of daylight illumination from windows can be about three times more effective in producing visibility. If this is true, then visibility-based lighting controls will result in greater energy conservation than will illumination-based lighting controls. A mathematical technique has been developed suitable for an intelligent microprocessor-based equi-visibility lighting control system. In an example room, a computer simulation compares the energy consumption for on-off, high-low-off, equi-illumination, and equi-visibility lighting controls systems. (Author)

ESDU-79012 PC**$770.50**
Engineering Sciences Data Unit Ltd., London (England).
Heat Pipes - Performance of Capillary-Driven Design.
c1979, 31p ISBN-0-85679-256-X
Also pub. as ISSN-0141-402X.
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

The purpose is to provide a method of calculating the maximum rate of heat transfer that a capillary-driven heat pipe can sustain, and a method of calculating the actual rate of heat transfer with given thermal boundary conditions. Applications include rating calculations for heat pipes used in cooling systems or in air to air heat exchangers. The methods apply to tubular heat pipes that contain a single-component working fluid and in which capillary forces drive the liquid flow in a wick structure.

N80-14495/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Development and Testing of the Junkeeper Control Corporation Integrated Programmable Electronic Controller and Hydronics Package.
Final Report.
J. D. Hankins. Aug 79, 21p NASA-TM-78244

Additional developmental work on the existing programmable electronic controller and hydronic package for use with solar heating and cooling systems is summarized. The controller/hydronics subsystems passed all acceptance tests and performance criteria. The subsystems were shown marketable for public use.

N80-14496/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Development and Testing of the Rho Sigma Incorporated Microprocessor Control Subsystem.
Final Report.
J. D. Hankins. Oct 79, 23p NASA-TM-78246
Contract NAS8-32256
Subm-Sponsored in Part by DOE.

Product development and performance tests of three programmable microprocessor controllers for use with solar heating and cooling systems are presented. The products were developed to be marketable for public use.

N80-14499/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Development, Testing and Certification of the sigma Research, Maxi-Therm-S-101 Thermosyphon Heat Exchanger.
Final Report.
J. D. Hankins. Oct 79, 19p NASA-TM-78245

A thermosyphon liquid-to-air heat exchanger developed for use in heating systems in residential single family dwellings and small commercial applications is described. The cabinet design, rationale for the horizontal positioning of the exchanger, and design of the shut-off valve are discussed. The performance of the heating module is given in tabular form.

N80-14501/4 PC **A07**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Computer Program for Assessing the Economic Feasibility of Solar Energy for Single Family Residences and Light Commercial Applications.
J. A. Forney, D. Walker, and M. Lanier. Sep 79, 147p NASA-TM-78251

Computer program, SHCOST, was used to perform economic analyses of operational test sites. The program allows consideration of the economic parameters which are important to the solar system user. A life cycle cost and cash flow comparison is made between a solar heating system and a conventional system. The program assists in sizing the solar heating system. A sensitivity study and plot capability allow the user to select the most cost effective system configuration.

PB80-127293 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY. Cornell Energy Project.
The Minimization of Air Heat-Exchange Surface Areas of Dry Cooling Towers for Large Power Plants,
F. K. Moore. Jun 73, 33p PAPER-73-2, NSF/RA/N-73/132
Report on National Energy Needs and Environmental Quality.

A mathematical study is reported which relates various factors of a heat exchanger for large, dry power plant coolers to costs. The presentation records the previously derived equation for size minimization and proceeds to the derivation of a corresponding equation concerning air-side heat exchange areas. Computed requirements are compared for a small heat exchanger's size and tower size. Equations are derived for tower size, heat-exchange area, and ideal heat exchanger configuration and size. High temperature cooling cycles are analyzed. These mathematical formulations indicate that both exchanger and tower sizes are most strongly reduced by increasing initial temperature differences. Tower size varies inversely with free-flow area, while heat exchanger size varies directly with free-flow volume. Hence, a heat exchanger should be as shallow as possible. Air temperature rise depends on the costs of the heat exchanger and on the tower sizes. The width of a very shallow heat exchanger must be small. It is proposed that airfoil-shape water columns be used. The cost of a heat exchanger for a large dry cooling tower for a power plant is related to airside surface area of the exchanger.

PB80-804107 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solar Furnaces (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 80,
Audrey S. Hundemann. Feb 80, 60p
Supersedes NTIS/PS-79/0031 and NTIS/PS-78/0001.

Design, operation, and performance of solar furnaces are discussed in abstracts from worldwide literature. Topic areas include the thermodynamics and optics of operation, and the performance of the large solar furnace located at Odeillo (France). (This updated bibliography contains 53 abstracts, 7 of which are new entries to the previous edition.)

13B. Civil Engineering

AD-A078 431/4 PC **A03**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme CA
Engineering Evaluation of Sorbent Dispensing/Collection System-Universal Mounting Arrangement.
Final rept.,

Clifford I. Skaalen, and Arthur B. Rausch. Feb 79, 46p USCG-D-33-79
Contract MIPR-Z-70099-7-73715-A

The success of the Sorbent Oil Recovery System in the open sea will depend greatly on its mode of transportation through the oil slick. This study was made to identify optimum vessels and mounting concepts. Sorbent system requirements were established from which candidate vessels were identified. Alternative mounting concepts were defined and evaluated which resulted in the recommendation of developing a new component arrangement which minimizes interaction between the Sorbent Oil Recovery System and the candidate vessel.

AD-A078 472/8 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Camp Karney Dam (NJ-00106), Delaware River Basin, Salem Creek, Salem County, New Jersey. Phase I Inspection Report.
Final rept.,
F. Keith Jolls. Aug 79, 61p
Contract DACW61-79-C-0011
Prepared in cooperation with Berger (Louis) and Associates, East Orange, NJ. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A078 618/6 PC **A04**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme CA
Seismic Soil Liquefaction at the Waterfront.
Final rept. Oct 77-Oct 78,
J. B. Forrest, and J. M. Ferritto. May 79, 57p
Rept no. CEL-TN-1555

The vulnerability of waterfront facilities to earthquake-induced soil liquefaction has been demonstrated during several recent earthquakes. A liquefaction threat analysis conducted by the Navy has suggested, however, that reliable procedures for precisely evaluating the extent of this hazard to waterfront structures are not currently available. As a part of a program to remedy this problem, the earthquake-induced liquefaction potential at a coastal Naval installation was evaluated by means of cyclic triaxial testing of undisturbed soil samples. This study shows that for the particular sensitive soil tested, the resistance to liquefaction as determined by laboratory testing of undisturbed samples is considerably larger than that determined using correlations with in situ penetration resistance tests. Both dynamic split spoon driving resistance and quasi-static friction cone resistance were measured in the tests. Field evaluation techniques are discussed, and those considered most promising are noted. Several total stress and effective stress computer codes are discussed, with particular attention to those incorporating pore water dissipating mechanisms. Several example solutions from the literature are presented. (Author)

AD-A078 621/0 PC **A05**/MF **A01**
Texas Univ At Austin Center for Cybernetic Studies
A Chance-Constrained Goal Programming Model to Evaluate Response Resources for Marine Pollution Disasters.
Research rept.,
A. Charnes, W. W. Cooper, K. R. Karwan, and W. A. Wallace. Apr 79, 76p Rept no. CCS-323
Contracts N00014-75-C-0616, N00014-75-C-0569
Prepared in cooperation with Rensselaer Polytechnic Inst., Troy, NY. School of Management under Contract DOT-CG-73707-B and Carnegie-Mellon Univ., Pittsburgh, PA. School of Urban and Public Affairs under Contract N00014-75-C-0932.

This paper develops a model to aid Coast Guard managers in formulating appropriate policies with respect to planning for various types of equipment required to contain major pollution incidents. The model is elaborated in terms of three primary stages of response: offloading, containment, and removal. The zero order rule of chance-constrained programming is used to obtain a deterministic equivalent of the original chance-constrained model. This is then replaced by a goal programming formulation to allow for plans that come 'as close as possible' to desired quality and risk levels for each pertinent region and type of incident. Numerical examples illustrate potential uses of the model with special emphasis on its value for budgetary (equipment) planning by central management that extends to evaluation of risk and performance quality levels, as well as the usual dual evaluator approaches for evaluating initially prescribed levels of equipment and their efficiency coefficients. (Author)

AD-A078 651/7 PC **A04**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Hydraulics Lab
Carquinez Strait, California, Salinity Barrier Calibration Study. Hydraulic Model Investigation.
Final rept. Apr 77-Apr 78,
Rutherford C. Berger, Jr., and M. J. Trawle. Nov 79, 72p Rept no. WES/TR/HL-79-18

The primary objective of this study was to develop three distorted-scale salinity barriers for use in a comprehensive model of the San Francisco Bay-Delta. Tests were also conducted to define the influence of the structures on velocities and flow distribution as they may affect navigation or cause erosion and as the model distortion may affect velocity distribution. Tests were conducted in a 1:100 undistorted-scale model that reproduced about 2 miles of Carquinez Strait and a 1:100 vertical and 1:1000 horizontal distorted-scale model that reproduced about 4 miles of Carquinez Strait. The distorted-scale model included an artificial bend that exists in the San Francisco Bay-Delta model. All tests were conducted with steady-state flow in both ebb and flood directions. The head losses for each salinity barrier were defined for a range of discharges in both ebb and flood directions in the undistorted-scale model. Tests were then conducted in the distorted-scale model with various crest widths and side slopes of the salinity barriers until head losses were duplicated. Velocities were measured at 23 locations in the undistorted-scale model at 500,000 cfs with and without the salinity barrier to define changes in velocity distribution. Velocities were also measured in the distorted-scale structure to define the influence of model distortion or flow distribution. Surface current patterns were defined for the salinity barrier that resulted in the highest probability of adverse erosion.

AD-A078 652/5 PC **A06**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Geotechnical Lab
Investigation of Beach Sand Trafficability Enhancement Using Sand-Grid Confinement and Membrane Reinforcement Concepts. Report 1. Sand Test Sections 1 and 2.
Technical rept.,
Steve L. Webster. Nov 79, 106p Rept no. WES/TR/GL-79-20

Containerization of Army cargo for use in overseas theater of operations is progressing. The discharging of containers from containerships and moving them across beaches in logistic over-the-shore operations is a problem that the Army must be capable of handling. The objective of this study was to investigate sand-grid confinement and membrane reinforcement concepts for possible application in moving containers over unstable beach sands using wheeled vehicles such as the XM 878 truck tractor and XM 872 semitrailer. In particular, it was desired to determine the optimum grid cell size and minimum surfacing requirements for handling the over-the-shore container operations. A secondary objective was to test the potential use of buried membrane as expedient means for enhancing truck-semtrailer trafficability over beach sands. Two test sections containing a total of 14 test items were constructed and subjected to truck traffic. The tests included three membrane reinforcement items, 10 sand-grid confinement items, and one control item. Also tested in conjunction with the test items were four expedient-type surfacings.

AD-A078 696/2 PC **A04**/MF **A01**
Corps of Engineers Buffalo NY Buffalo District
Lake Erie Wastewater Management Study. Honey Creek Watershed Report.
Final rept.,
Thomas H. Cahill, and Robert W. Pierson. Mar 79, 75p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report concerns the relationships between farm management and water quality in the Lake Erie basin. It is presented as a public information report for the working agricultural community and as a technical report for planning agencies in the Lake Erie basin. This report was designed for these purposes for the Buffalo District of the Army Corps of Engineers by Resource Management Associates (RMA) of West Chester, PA, as part of Phase II of the Lake Erie Wastewater Management Study (LEWMS). The report, as a public information document, describes how agricultural activities relate to water quality and suggests opportunities to improve water quality by changing farm management practices. Its ultimate concern is water quality in Lake Erie and it uses the Honey Creek watershed in the Sandusky River Basin as the focus for discussing these issues. The report will also serve as a model for similar reports on other watersheds within the Lake Erie basin on which programs will be implemented to develop a Lake Erie basin-wide water quality program. These subsequent watersheds will include some urban water sheds as well as other agricultural basins. (Author)

AD-A078 701/0 PC **A17**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Hydraulics Lab
Mayport-Mill Cove Model Study. Report 3. Mill Cove Study. Hydrauilc Model Investigation.
Technical rept. Dec 77-Aug 78,
Noble J. Brogdon, Jr., and Joseph W. Parman. Sep 79, 397p Rept no. WES/TR/HL-79-12-3
See also Report 1, AD-A073 601.

A fixed-bed model of Mayport-Mill Cove constructed to scales of 1:500 horizontally and 1:50 vertically, reproduced a portion of the Atlantic Ocean adjacent to the entrance and the St. Johns River upstream to Hibernia Point. The purpose of the model study was twofold: (a) to investigate the effects of proposed improvement plans for the Mayport Naval Basin area on existing shoaling rates, hydraulics, salinities, and flushing; and (b) to investigate the effects of proposed improvement plans in the Mill Cove area on flushing, hydraulics, salinities and channel shoaling. The model verification tests described in Report 1 indicated that the model hydraulic and salinity regimes were in satisfactory agreement with those of the prototype for comparable conditions. Based on visual observations and analysis of surface current pattern photographs conducted for 20 proposed plans, 3 plans (15, 18 and 20) were selected for further, more extensive testing. Each plan involved an enlarged weir opening 1,300 ft wide by 12 ft deep at msl and the relocation of approximately, 1,400 ft from the west end of the disposal island located off Reddie Point to the east end of the disposal island. Plan 15 included the above weir and disposal island changes in addition to the construction of a triangular-shaped island inside Mill Cove. Plan 18 involved only the above weir and disposal island changes. Plan 20 included the above weir and disposal island changes in addition to an enlargement of Quarantine Island into Mill Cove.

AD-A078 703/6 PC **A08**/MF **A01**
General Electric Co Cincinnati OH Aircraft Engine Group
Advanced Catalytic Combustors for Low Pollutant Emissions.
Final rept. on Phase 1,
W. J. Dodds. Nov 79, 172p R79AEG625, NASA-CR-159535, CEEDO-TR-79-03
Contract NAS3-20820

The objective of this design was to evaluate the feasibility of employing the known attractive and distinguishing features of catalytic combustion technology to reduce NOx emissions from gas turbine engines during subsonic, stratospheric cruise operation. Six conceptual combustor designs employing catalytic combustion were defined and evaluated for their potential to meet specific emissions and performance goals. Based on these

evaluations, two parallel-staged, fixed-geometry designs were identified as the most promising concepts. Additional design studies were conducted to produce detailed preliminary designs of these two combustors. Results of these design studies indicate that cruise NOX emissions can be reduced by an order of magnitude relative to current technology levels by the use of catalytic combustion. Also, these combustors have the potential for operating over the EPA landing-takeoff cycle and at cruise with a low pressure drop, high combustion efficiency and with a very low overall level of emission pollutants. The use of catalytic combustion, however, requires advanced technology generation in order to obtain the time-temperature catalytic reactor performance and durability required for practical aircraft engine combustors. (Author)

AD-A078 725/9 PC A08/MF A01
Army Engineer Waterways Experiment Station Vicksburg MS Geotechnical Lab
Utilization of Marginal Construction Materials for LOC.
Final rept. Jul 75-Sep 78,
Robert W. Grau. Nov 79, 173p Rept no. WES/TR/GL-79-21
See also Rept. no. AEWES-INSTRUCTION-S-74-3 dated Sep 74, AD-A001 521.

The purpose of this report is to develop methodology and procedures for using marginal quality aggregates (aggregates not meeting existing specifications) in the construction of asphalt and portland cement concrete surface pavement layers. The report describes a laboratory study performed on bituminous mixes made from marginal aggregate materials and the testing of a specially designed test section consisting of both flexible and rigid pavement surface layers made of marginal quality aggregates. Also presented are construction techniques and the behavior of the marginal aggregate mixes subjected to accelerated 5-ton military dump truck and two types of tracked vehicle traffic. Recommended properties of asphalt and portland cement concrete mixes made of marginal aggregate materials are presented to aid the military engineer in constructing paved surfaces that are to be used only for limited traffic and short periods of service life. (Author)

AD-A078 743/2 PC A05/MF A01
Cold Regions Research and Engineering Lab Hanover NH
Prototype Overland Flow Test Data: June 1977 - May 1978.
Special rept.,
T. F. Jenkins, H. E. Hare, A. J. Palazzo, R. E. Bates, and C. J. Martel. Nov 79, 98p Rept no. CRREL-SR-79-35

A prototype overland flow land treatment system was operated at Hanover, New Hampshire, over a one-year cycle from June 1977 to May 1978. The individual data points collected over this period for water quantity and quality are presented as well as plant yields and nutrient uptake. The soil chemical and physical parameters measured are also presented along with a table of initial site characteristics. The meteorological measurements obtained in support of this effort are included to complete the data base. (Author)

AD-A078 773/9 PC A03/MF A01
Army Engineer Waterways Experiment Station Vicksburg MS Hydraulics Lab
Pumping Stations - Field Performance Investigation.
Final rept. May-Jun 77,
Bobby P. Fletcher. Jul 79, 36p Rept no. WES/MP/HL-79-7

There is very little documentation available for the design of channel approaches and sumps, which are important components in the hydraulic performance of pumping stations. To develop guidance for design of approaches and pumping stations, limited field performance investigations were conducted. Evaluation of field performance was based upon the observation of 42 pumping facilities in five Corps of Engineers Districts and discussions with representatives of those districts regarding hydraulic performance and problem areas. Observations ad discussions of the various pumping stations, which range in age from 4 to 44 years, indicated that the best hydraulic performance occurred at stations with the most symmetrical geometry and uniformly distributed flow to the pump intakes. Satisfactory flow conditions were usually provided by a relatively long and straight approach channel, a streamlined transition from the approach channel to the sump, and a symmetrical sump design. Eddies and adverse circulation of flow, generated by curved approach channels and/or abrupt transitions from the approach channel to the sump, tended to induce vortexes in the sump. Postconstruction modifications such as umbrellas, vanes, grids, floats, and fillets were reported to be effective in reducing adverse flow conditions in sumps. Tests have been initiated in a general research facility capable of simulating a variety of pumping stations.

AD-A078 792/9 PC A02/MF A01
Forest Products Lab Madison WI
Strength of Log Bridge Stringers After Several Year's Use in Southeast Alaska.
Forest Service research paper,
R. C. Moody, R. L. Tuomi, W. E. Eslyn, and F. W. Muchmore. 1979, 4p Rept no. FSRP-FPL-346

Bending tests of 28 untreated log stringers from 12-year-old native timber bridges in southeast Alaska showed significant reductions in strength due to decay. Compared to results on fresh logs, strength reduction was about 25 percent, and could be predicted based on the loss in section modulus due to decay. Log stiffness was not significantly affected. Results will be helpful to engineers with responsibility of rating the load capacity of bridges having untreated log stringers. (Author)

AD-A078 835/6 PC A08/MF A01
Yang (Nai C) and Associates New York
Nondestructive Evaluation of Airport Pavements. Volume I. Program References,
Nai C. Yang. Sep 79, 174p FAA-RD-78-154-1
Contract DOT-FA77WA-3964

The concept of nondestructive evaluation and functional pavement design has been integrated in a computer program which is operational at Transportation Computer center in Washington, D.C. (TCC). The program logic and operational procedures are outlined in this report. The NONDESTRUCTIVE TEST can be used as a substitute for the plate load test without interference to airport operation. All test data are processed and compiled in a NDT inventory file. The strength of existing pavements is evaluated in terms of anticipated functional life as governed by cumulative stress damage and progressive surface deformation. The final program output is the cost information for ten design alternatives of equal functional performance. Correlations have been made between the NDT data and subgrade geology, regional climate, airport operation, existing pavements and response of airport bridges. The current version of FAA standards is open to divergent interpretations and it does not indicate the cost effectiveness of a pavement program. A universal testing procedure has been introduced to evaluate the dynamic response of pavement materials. The program is written in a high level language FORTRAN IV and involves extensive use of data storage and filing techniques.

AD-A078 836/4 PC A09/MF A01
Illinois Univ At Urbana-Champaign Dept of Civil Engineering
Longitudinal Joint Systems in Slip-Formed Rigid Pavements. Volume II. Analysis of Load Transfer Systems for Concrete Pavements.
Interim rept.,
A. M. Tabatabaie, E. J. Barenberg, and R. E. Smith. Nov 79, 193p FAA-RD-79-4-2
Contract DOT-FA-11-8474
See also Volume 3, AD-A078 850.

This report covers the development of rigid pavement joint models, the theoretical evaluation of joint systems and the results and conclusions reached from these studies. This is Volume II of a three volume series on the design and construction of longitudinal joint systems in slip-formed concrete pavements. Volume I - Literature Survey and Field Inspection - dated January 1979, was issued earlier. Volume II - User's Manual is now being printed. This report emphasizes the theoretical evaluation of joint systems. Although the study was primarily for the analysis of longitudinal joint systems for use with slip-formed pavements, the data is applicable to the analysis/design of other types of joints in rigid pavements. The study has been divided into 4 phases. Part 1, Extensive Literature Review; Part 2, Development of Rational Structural Analysis Methods; Part 3, The Finite Element Computer Model is compared with other theoretical Methods; Part 4 Studies Were Made to Define the Interaction of Joint Components and How They Affect the Stresses and Deflections of the Pavements. Cost data are given for the various alternate systems considered. (Author)

AD-A078 850/5 PC A05/MF A01
Illinois Univ At Urbana-Champaign Dept of Civil Engineering
Longitudinal Joint Systems in Slip-Formed Rigid Pavements. Volume III. User's Manual.
Interim rept.,
Amir M. Tabatabaie, and Ernest J. Barenberg. Nov 79, 77p FAA-RD-79-4-3
Contract DOT-FH-11-8474
See also Volume 1, AD-A066 320.

This is the third volume of a three volume series on the design and construction of longitudinal joint systems in slip-form concrete pavements. Volume I (Literature Survey and Field Inspection) and Volume II (Analysis of Load Transfer Systems for Concrete Pavements) have been already published. Long a subject of major concern, the determination of the affects that joints and/or cracks have on the stress and deflection of concrete pavements has lead to the development of several methods of analysis. The authors have selected the finite element modeling technique and with the aid of the high-speed computer their method is capable of structurally analyzing concrete pavement systems with joints and/or cracks. The computer program can be used for the analysis of a number of problems which can be summarized as follows: (1) Concrete pavements with load transfer systems at the joints. (2) Jointed reinforced concrete pavements with cracks having reinforcement steel at the cracks. (3) Continuously reinforced concrete pavements. (4) Concrete shoulders with or without tie bars. (5) Concrete pavements with a stabilized base or an overlay and assuming either a perfect bond or no bond between two layers. (6) Concrete slabs of varying thicknesses and modulus of elasticities, and subgrades with varying modulus of supports. (Author)

AD-A078 855/4 PC A04/MF A01
Army Engineer Waterways Experiment Station Vicksburg MS Hydraulics Lab
North Fork Lake Spillway, San Gabriel River, Texas. Hydraulic Model Investigation.
Final rept. May 74-May 75,
Edward D. Rothwell. Oct 76, 69p Rept no. WES-H-76-10

The spillway for North Fork Lake Dam will consist of a 1000-ft-wide uncontrolled broad-crested weir excavated in limestone located in the right abutment of the dam. An outlet works consisting of two flood-control and four low-flow inlets will discharge into a hydraulic-jump-type stilling basin and exit channel located on the downstream side of the earth-filled dam. Model investigations were conducted using a 1:80-scale model to develop a design that would eliminate the destructive currents along the toe of the earth-fill dam embankment and in the vicinity of the outlet works stilling basin and spillway discharge channel. The model was also used to measure velocities, surging, and flow patterns for several discharges in the approach and discharge channels and to determine the design of a rockfill dike at the upstream left abutment of the spillway. Tests indicated that a 100-ft-long ellipitical-shaped dike would be required in the vicinity of the upstream left abutment to provide protection for the dam embankment and retaining wall. The minimum stone size (d50 = 16 in.) required for stability of the upstream rockfill dike was determined from the model. The hydraulic performance of the spillway crest design was satisfactory for a range of anticipated discharges. The model investigation also indicated that additional protection would be required in the exit channel and the San Gabriel River basin to ensure the stability of the dam embankment against scour.

AD-A078 866/1 MF A01
Baker (Michael) Jr Inc Beaver PA

National Dam Inspection Program. Bradford City Number 5 Dam (Tuna Creek Dam) (NDI Number PA 00026 PennDer Number 42-31) Ohio River Basin, West Branch of Tunungwant Creek, McKean County, Pennsylvania. Phase I Inspection Report,
Chuan Yuan Chen. Aug 79, 97p
Contract DACW31-79-C-0011
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Bradford City No. 5 Dam and Reservoir is a water supply dam owned and operated by the Bradford City Water Authority. The dam is also known by the names Tuna Creek and Hazelton Mills Dam. The total length of the dam is approximately 1200 feet of which the embankment is 1100 feet and the crest width of the ogee section spillway is 93 feet. The maximum height of the dam is 68 feet and the maximum reservoir storage is 3390 acre-feet. Hydraulic/hydrologic evaluations, performed in accordance with procedures established by the Baltimore District, Corps of Engineers, for Phase I Inspection Reports, revealed that the spillway will pass the Probable Maximum Flood(PMF) without overtopping the dam. The spillway is therefore considered 'adequate'. The dam was found to be in good overall condition at the time of the inspection. However, the owner should perform several items of work without delay.

AD-A078 867/9 MF **A01**
Gai Consultants Inc Monroeville PA
National Dam Inspection Program. Cherry Run Dam (NDS I.D. Number PA-00278 PENNDER I.D. Number 32-40), Ohio River Basin, Cherry Run, Indiana County, Pennsylvania. Phase I Inspection Report,
Bernard M. Mihalcin. Aug 79, 103p
Contract DACW31-79-C-0013
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Cherry Run Dam is a zoned earth embankment with a central concrete corewall. The embankment measures approximately 430 feet long (including spillway) and 22 feet high. The facility is provided with an ogee-shaped concrete spillway located about 100 feet from the right abutment. The spillway crest is 132 feet long. Based on a visual inspection, maintenance of Cherry Run Dam appears minimal to non-existent and the facility is considered to be in poor condition. Deficiencies noted by the inspection team included heavy overgrowth of the embankment sections (particularly to the right of the spillway), delamination of the spillway surface, cracking and misalignment of the spillway wingwalls, heavy overgrowth within the discharge channel, an inoperable outlet works, and no emergency warning systems in effect. Results of the hydrologic and hydraulic analysis indicate the facility will pass and/or store only 40 percent of the PMF prior to embankment overtopping. A Breach analysis indicates that failure under less than 1/2 PMF conditions could lead to increased downstream damage and potential for loss of life. Thus, based on screening criteria provided in the recommended guidelines, the spillway is considered to be seriously inadequate and the facility unsafe, non-emergency.

AD-A078 868/7 MF **A01**
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. Kelsey Creek Dam (NDI I.D. Number PA-00031 DER I.D. Number 59-64 SCS I.D. Number PA-600), Susquehanna River Basin, Kelsey Creek, Tioga County, Pennsylvania. Phase I Inspection Report,
Frederick Futchko. Aug 79, 86p
Contract DACW31-79-C-0015
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Kelsey Creek Dam consists of a zoned, earthfill embankment that is 860 feet long and 66 feet high at maximum section. The main spillway is a drop spillway located near the center of the embankment. It consists of a concrete riser that connects to a 36-inch diameter reinforced concrete pipe under the embankment. The auxiliary spillway is at the right abutment of the dam. It is a grass-lined excavation in earth. Based on visual inspection, available records, calculations and past operational performance, Kelsey Creek Dam is judged to be in good condition. The existing spillway can pass the Probable Maximum Flood (PMF) without overtopping of the dam. The spillway capacity is rated as adequate. There is a slope stability analysis for the embankment, and it indicates that the embankment has adequate factors of safety. There is no evidence of significant problems threatening the embankment. No deficiencies were noted during the visual inspection.

AD-A078 869/5 MF **A01**
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. Bryant Pond Dam (NDI I.D. Number PA-00544 DER I.D. Number 40-11), Susquehanna River Basin, Harveys Creek, Luzerne County, Pennsylvania. Phase I Inspection Report,
Frederick Futchko. Jul 79, 120p
Contract DACW31-79-C-0015
Availability: Microfiche copies only.

Bryant Pond Dam is an earthfill and rockfill dam with a concrete core-wall. The earthfill extends along the upstream side of the core-wall and the rockfill extends along the downstream side. The dam, including the main and auxiliary spillways, is 425 feet long. The design height is 19 feet. The main spillway is located near the left abutment of the dam. It is a series of concrete slabs forming a cascade to the natural stream. Other than its exterior lines and grades, details of the main spillway are unknown. The main spillway crest is 40 feet long and 5 feet below the design top of the dam. The auxiliary spillway was designed to be a 175-foot long by 2-foot deep notch in the concrete core-wall. It was constructed 200 feet long. The auxiliary spillway was designed to allow water to flow over the rockfill on the downstream slope of the embankment. The outlet works is located directly to the right of the main spillway. It consists of two 2-foot square concrete conduits with concrete sluice gates at the upstream end. The various features of the dam, as designed, are shown on the Plates at the end of the report. The existing features are shown in Appendix D. (Author)

AD-A078 870/3 MF **A01**
Kimball (L Robert) and Associates Ebensburg PA
National Dam Inspection Program. North Fork Dam (NDS ID Number PA-28 DER ID Number 53-57 SCS ID Number PA-406), Susquehanna River Basin, White Branch of North Fork, Potter County, Pennsylvania. Phase I Inspection Report,
Kuang-hwei Chuang. Sep 79, 71p
Contract DACW31-79-C-0009
Availability: Microfiche copies only.

North Fork Dam is a homogeneous earthfill dam 622 feet long and 58 feet high. The principal spillway is a two-stage drop inlet spillway with a 30' diameter reinforced concrete pipe. The riser unit is 2.5 feet by 7.5 feet and is 33 feet high. The emergency spillway is located on the left abutment and is formed by a trapezoidal shaped open cut in glacial sand clay and gravel. The bottom width of the spillway channel is 100 feet. The spillway exit channel is 482 feet long and discharges on the left hillside below the toe of the dam. The inspection and review of data of North Fork Dam did not reveal any problems which require emergency action. The dam appears to be stable, well maintained, safely operated and in good condition. However, the spillway and reservoir are capable of controlling 60% of Probable Maximum Flood without overtopping the earth embankment. Based upon criteria established by the Corps of Engineers, the spillway is termed inadequate, but not seriously inadequate. In addition, the earth berm in the emergency spillway exit channel is low and overtopping of the berm during flood conditions will cause erosion of the embankment/abutment contact. This spillway berm will be overtopped at approximately 25% of the PMF.

AD-A078 871/1 MF **A01**
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. Sunrise Lake Dam (NDI ID Number PA-00556 DER ID Number 40-216), Delaware River Basin, Pine Creek, Luzerne County, Pennsylvania. Phase I Inspection Report,
Frederick Futchko. Jul 79, 93p
Contract DACW31-79-C-0015
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Sunrise Lake Dam is a homogeneous earthfill embankment 478 feet long and 27 feet high at its maximum section. The embankment has a curved alignment. A concrete chute spillway is located near the right abutment of the top of the. The approach channel is the reservoir area. The ogee crest is 105 feet long and 7.25 feet lower than the design elevation of the dam. Based on visual inspection, available records, calculations, past operational performance, and according to criteria established for these studies, Sunrise Lake Dam is judged to be in good condition. The spillway capacity is rated as adequate. The spillway can pass the Probable Maximum Flood (PMF) without overtopping of the dam. The headwall at the conduit outlet is tilted and is considered to be unsatisfactory. In the absence of stability computations showing that an adequate factor of safety exists, the downstream slope is considered to have a marginal factor of safety because of the steepness of the slope.

AD-A078 872/9 MF **A01**
Berger Associates Inc Harrisburg PA
National Dam Inspection Program. Glen Brook Number 4 Dam (ndi Number PA-00650 DER Number 19-8), Susquehanna River Basin, Columbia County, Pennsylvania. Phase I Inspection Report.
Aug 79, 97p
Contract DACW31-79-C--0012
Availability: Microfiche copies only.

The Glen Brook No. 4 Dam is an earthfill dam 250 feet in length plus a 34 foot long spillway. It is 47 feet high above the streambed. This dam is the last of three such dams constructed in this area. The other two dams, identified as No. 1 and No. 2 are in series with and are located upstream from No. 4. This entire system of dams forms a source of reserve water supply for the Borough of Berwick. Based upon the visual inspection, past performance and the available engineering data, the dam and its appurtenant structures appear to be in fair condition. In accordance with the Corps of Engineers' evaluation guidelines, the size classification of this dam is intermediate and the hazard classification is high. The spillway capacity is inadequate to pass the PMF (Probable Maximum Flood) peak inflow without overtopping the dam. The spillway is capable of passing 10 percent of the PMF and is classified as seriously inadequate.

AD-A078 873/7 MF **A01**
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. Big Bass Lake Dam (NDI ID Number PA-00368 DER ID Number 35-126), Delaware River Basin, Tamarack Creek, Lackawanna County, Pennsylvania. Phase I Inspection Report,
Frederick Futchko. Jul 79, 94p
Contract DACW31-79-C-0015
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The essential features of Big Bass Lake Dam are a masonry gravity main spillway across the natural stream, an auxiliary spillway in an earthen cut, an embankment in a natural saddle, and an outlet works. The masonry gravity spillway extends across the stream and into the stream banks on each side. Based on visual inspection, available records, calculations, past operational performance, and according to criteria established for these studies, Big Bass Lake Dam is judged to be unsafe, nonemergency, because the spillway capacity is rated as seriously inadequate. The spillway can only pass 10 percent of the Probable Maximum Flood (PMF) without overtopping of the low area by the main spillway walls. It is estimated that the main spillway weir will fail at about the 20 percent PMF flood. The stability of the main spill-

way is considered marginal for the normal operating conditon. The stability is significantly worse for higher pool levels. There is no evidence of significant problems threatening the embankment.

AD-A078 874/5 MF A01
Berger Associates Inc Harrisburg PA
National Dam Inspection Program. Towamensing Trails Dam (NDI Number PA-00920 DER Number 13-108), Delaware River Basin, Carbon County, Pennsylvania. Phase I Inspection Report.
Aug 79, 77p
Contract DACW31-79-C-0012
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The Towamensing Trials Dam is a 38 foot high zoned earthfill dam with an embankment length of about 3200 feet. Impervious material forms the upstream section of the embankment and has a surface slope of 3H to 1V. Random fill makes up the remaining portion of the embankment and forms a downstream slope of 2.5H to 1V. An internal drainage system includes a vertical stone drain 30 inches in width over the major length of the embankment. This vertical drain connects to a horizontal blanket drain which discharges into a 12-inch diameter perforated drain pipe just beneath the downstream toe of the embankment. A five foot deep key trench of impervious soil is located at the upstream toe of the embankment. This trench has a bottom width of 30 feet. The spillway, located at the left abutment, is a 50 foot wide concrete ogee section with a crest elevation of 1,645. Design crest elevation of the embankment is 1650.5. The outlet channel for the spillway is paved with concrete and has concrete training walls extending to a point 300 feet downstream from the spillway.

AD-A078 875/2 MF A01
Woodward-Clyde Consultants Plymouth Meeting PA
National Dam Inspection Program. Pocono Lake Dam (nds I.D. Number PA 00781 DER I.D. Number 45-222), Delaware River Basin, Monroe County, Pennsylvania. Phase I Inspection Report,
John Boschuk, Jr., and John Henry Frederick, Jr. Jul 79, 98p
Contract DACW31-79-C-0017
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Pocono Lake Dam is a concrete ogee spillway with concrete non-overflow sections keyed on each side into a zoned earth embankment. The embankment contains an upstream impervious fill protected with three feet of dumped riprap over a one foot filter bed. The facility is considered to be in good condition and well maintained. Hydrologic and hydraulic calculations indicate the dam will pass the Probable Maximum Flood without overtopping. Therefore, the spillway system is considered to be 'Adequate'. Visual inspection of the dam and reservoir detected no significant problems with the structure. There was some leakage noted around the stilling basin walls, which was assessed to be drainage from the rock toe. Some minor cracking of the spillway walls was noted and the loss of some joint sealer was noted in the bride. These conditions are not considered to be critical.

AD-A078 877/8 MF A01
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. Briar Creek Dam (NDI ID Number PA-00651, DER ID Number 19-77, SCS ID Number PA-497), Susquehanna River Basin, East Branch Briar Creek, Columbia County, Pennsylvania. Phase I Inspection Report,
Albert Charles Hooke. May 79, 89p
Contract DACW31-79-C-0015
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Based on visual inspection, available records, calculations and past operational performance, Briar Creek Dam is judged to be in good condition. The existing spillway can pass the Probable Maximum Flood (PMF) without overtopping of the dam. The spillway capacity is rated as adequate. There is a slope stability analysis for the embankment, which indicates that the embankment has adequate factors of safety. There is no evidence of significant problems threatening the embankment. A slide and sinkholes have developed in the auxiliary spillway.

AD-A078 878/6 MF A01
Woodward-Clyde Consultants Plymouth Meeting Pa
National Dam Inspection Program. Big Boulder Dam (NDS ID Number PA 00615, DER ID Number 13-93), Delaware River Basin, Carbon County, Pennsylvania. Phase I Inspection Report,
John Boschuk, Jr. Jul 79, 97p
Contract DACW31-79-C-0017
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Big Boulder Dam is owned by the Big Boulder Corporation and serves as a recreation lake and water supply for snow making at the lodge. The dam was built in the summer of 1957, and is classified as an 'Intermediate' size dam by virtue of its 1,971 acre-foot maximum storage capacity. Big Boulder Lake is formed by Dam A across Grass Lake Creek and Dam B, a saddle dam on the watershed divide. In the event that Dam B fails, extreme property damage and a possibility for the loss of life exists downstream along Swamp Run, thus classifying the structure as a 'High' hazard dam. The hydroiogic and hydraulic calculations presented indicate that the spillway system for this structure is rated as 'Adequate' as it will pass the PMF. On the basis of the visual inspection on 11 May 1979, and review of available construction and design documentation, the dam and appurtenances of Big Boulder Reservoir appear to be functioning satisfactorily with the exception of undesirable seepage at the downstream toe of Dam A. The resident engineer's reports leave some question as to the quality of foundation preparation.

AD-A078 879/4 MF A01
Kimball (L Robert) and Associates Ebensburg Pa
National Dam Inspection Program. Lake Chillisquaque (NDS ID Number PA-815, DER ID Number 47-8), Susquehanna River Basin, Middle Branch of Chillisquaque Creek, Montour County, Pennsylvania. Phase I Inspection Report,
R. Jeffrey Kimball, and Kuang-Hwei Chuang. Aug 79, 69p
Contract DACW31-79-C-0009
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Lake Chillisquaque is an earth-fill dam 2000 feet long and 54 feet high. The dam is a zoned earth embankment with a center core consisting of silty clay material and the upstream and downstream portions consisting of weathered shale. The upstream and downstream slopes were constructed at 2.5H:1V with berms at elevation 582.0. The crest of the dam is 12 feet wide and forms an access road at elevation 605.5. The outlet works consist of a concrete control tower connected to two 36 in.. steel pipes encased in concrete. The outlet works has a positive upstream shut off in the form of a bulkhead. The flow through these pipes is regulated by a 36 in. sluice gate, an 18 in.. cone valve or an 8 in. by pass valve. At the toe of the dam is a valve house to control flow through these pipes. The earthen emergency spillway is located on the left abutment and contains a concrete sill 750 feet long. The spillway discharge channel is 1300 feet long and discharges to a natural stream. (Author)

AD-A078 880/2 PC A05/MF A01
D'Appolonia Consulting Engineers Inc Pittsburgh PA
National Dam Inspection Program. Little Blue Run Dam (NDI ID Number PA 917, DER ID Number 4-49), Ohio River Basin, Little Blue Run, Beaver County, Pennsylvania. Phase I Inspection Report,
Lawrence D. Anderson. Jun 79, 81p
Contract DACW31-79-C-0014
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Based on the evaluation of the existing conditions on March 14 and April 16, 1979, the condition of Little Blue Run Dam is considered to be good. No conditions were noted at this time that would significantly affect the structural performance of the dam. The flood discharge facilities for the dam were designed to pass the probable maximum flood (PMF) without overtopping the embankment. Therefore, according to the recommended criteria, the flood discharge facilities of the dam are adequate. Presently, the pool elevation is approximately 170 feet below the dam crest level. The pool elevation is expected to reach spillway crest level in about the year 2010. The following recommendations should be implemented on a continuing basis: (1) The cracking observed on the crest should continue to be evaluated by the design engineers. Also, attention should be given to the slump and seepage observed on the left abutment. Erosion ditches on the right abutment should be filled; and (2) A formal warning system should be developed to alert the downstream residents in the event of emergencies.

AD-A078 881/0 MF A01
D'Appolonia Consulting Engineers Inc Pittsburgh PA
National Dam Inspection Program. Musser Forests Dam (NDI ID number PA-287, DER ID Number 32-65), Ohio River Basin, McKee Run, Indiana County, Pennsylvania. Phase I Inspection Report,
Lawrence D. Anderson. Jun 79, 71p
Contract DACW31-79-C-0014
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Based on the evaluation of the conditions of Musser Forests Dam, the dam is considered to be unsafe due to severe erosion in the primary spillway and emergency discharge channel along the toe of the dam near the left abutment and due to the lack of an operable outlet works for the reservoir. However, it is not considered to be an emergency condition. Field observations indicate that the crest of the dam is irregular with elevations ranging from 1.7 to 5.9 feet above the emergency spillway crest level. The irregularities do not appear to be due to recent movements. The upstream slope of the dam has no erosion protection and has been partially eroded by wave action. The emergency spillway approach channel is overgrown with tall grass and cattails which may constitute a partial obstruction to flow through the spillway. The flood discharge capacity of Musser Forests Dam was evaluated and found to pass 30% of the probable maximum flood (PMF) without overtopping the low spot on the crest of the dam. Therefore, according to the recommended criteria, the flood discharge capacity of Musser Forests Dam is classified to be inadequate.

AD-A078 882/8 MF A01
Kimball (L Robert) and Associates Ebensburg PA
National Dam Inspection Program. Hamilton Lake Dam (NDS ID Number PA-33, DER ID Number 59-65, SCS ID Number PA-602), Susquehanna River Basin, Charleston Creek, Tioga County, Borough of Wellsboro, Pennsylvania. Phase I Inspection Report,
Kuang-hwei Chuang, and R. Jeffrey Kimball. Sep 79, 72p
Contract DACW31-79-C-0009
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The assessment of the Hamilton Lake Dam is based upon visual observations made at the time of inspection (June 28, 1979), review of available records and data, review of available data, hydrology and hydrologic and past operational performance. The inspection and review of data of Hamilton Lake Dam did not reveal any problems which require emergency action. The dam appears to be stable, well maintained, safely operated and in good condition. Hamilton Lake Dam is a high hazard-intermediate size dam. The spillway design flood is the PMF (Probable Maximum Flood). The spillway and reservoir are capable of controlling

the PMF. Based upon the criteria established by the Corps of Engineers, the spillway is termed adequate. The following recommendations and remedial measures should be instituted immediately: (1) Continue annual safety inspections and operation and maintenance inspections; and (2) A warning system should be instituted to warn downstream residents of large spillway discharges or failure of the dam.

AD-A078 883/6 MF A01
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. Lake Nessmuk Dam (NDI ID Number PA-00032), DER ID Number 59-66, SCS ID Number PA-601), Susquehanna River Basin, Morris Branch, Marsh Creek, Tioga County, Pennsylvania. Phase I Inspection Report,
Frederick Futchko. Aug 79, 81p
Contract DACW31-79-C-0015
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Based on visual inspection, available records, calculations and past operational performance, Lake Nessmuk Dam is judged to be in good condition. The existing spillway can pass the Probable Maximum Flood (PMF) without overtopping of the dam. The spillway capacity is rated as adequate. There is a slope stability analysis for the embankment, and it indicates that the embankment has adequate factors of safety. There is no evidence of problems threatening the embankment. The visual inspection (25 July 1979) revealed that it is uncertain that the gate is operational. (Author)

AD-A078 884/4 MF A01
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. PA-468 Dam (NDI ID Number PA-00046, DER ID Number 58-132, SCS ID Number PA-468), Susquehanna River Basin, Brooklyn Run, Susquehanna County, Pennsylvania. Phase I Inspection Report,
Frederick Futchko. Aug 79, 79p
Contract DACW31-79-C-0015
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property. The dam consists of a homogeneous earthfill embankment that is 680 feet long and 64 feet high at its maximum section. The main spillway is a drop spillway located near the left abutment of the dam. It consists of a concrete riser connected to a 30-inch diameter reinforced concrete pipe under the embankment. One 12-inch by 21-inch uncontrolled orifice is located in the upstream face of the concrete riser with the orifice crest at El. 1227.0, which is 27 feet below design elevation of the top of the dam. The auxiliary spillway is an excavated channel at the right abutment of the dam. It is grass-lined except for portions that were excavated into rock. The hazard classification is high hazard. Downstream conditions indicate that a high hazard classification is warranted for PA-468 Dam. It is owned by the Susquehanna County Commissioners. Its purpose is for flood control.

AD-A078 885/1 MF A01
Kimball (L Robert) and Associates Ebensburg PA
National Dam Inspection Program. Beechwood Lake Dam (NDS ID Number PA-37, DER ID Number 59-61, SCS ID Number PA-454), Susquehanna River Basin, East Beech Woods of Mill Creek, Tioga County, Pennsylvania. Phase I Inspection Report,
Kuang-hwei Chuang, and R. Jeffrey Kimball. Sep 79, 71p
Contract DACW31-79-C-0009
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Beechwood Lake Dam is an earthfill dam 1030 feet long and 63 feet high. The embankment is a zoned earth embankment consisting of a center impervious core section with pervious upstream and downstream zones. The principal spillway consists of a 30 inch diameter reinforced concrete pipe with a 2.5 foot x 7.5 foot reinforced concrete riser. The inspection and review of data of Beechwood Lake Dam did not reveal any problems which require emergency action. The dam appears to be stable, well maintained, safely operated and in good condition. Beechwood Lake Dam is a high hazard-intermediate size dam. The spillway design flood is the PMF (Probable Maximum Flood). The spillway and reservoir are capable of controlling the PMF. Based upon the criteria established by the Corps of Engineers, the spillway is termed adequate.

AD-A078 886/9 MF A01
O'Brien and Gere Engineers Inc Philadelphia PA
Justin and Courtney Div
National Dam Inspection Program. Shangri-La Dam (NDI-PA-00248, PA-DER-15-295), Delaware River Basin, Broad Run, Chester County, Pennsylvania. Phase I Inspection Report,
John J. Williams. Aug 79, 71p
Contract DACW31-79-C-0010
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Shangri-La Dam is a homogeneous, impervious, earth embankment with a downstream layer of random fill. The dam is approximately 800 feet long with a maximum height of 32 feet and is provided with a vertical sand drain in the downstream section. The level of the reservoir is controlled by means of a rectangular, reinforced concrete, drop inlet spillway (service spillway) located near the right abutment(looking downstream). A 150-foot wide, grass covered spillway(emergency spillway) provides additional discharge capacity and is also located in the right abutment area. The dam was constructed to impound a reservior for recreational purposes. Examination of the results of the hydrologic and hydraulic analyses indicates that the spillway system (service and emergency spillway) is capable of passing the entire Probable Maximum Flood(PMF) without the dam being overtopped. The selected Spillway Design Flood for this Small size, High hazard structure is the PMF. Therefore, the spillway system is classified as Adequate. Based on visual observations (June 12, 1979), discussions with the Owner's representative, and review of the information obtained from the Pennsylvania Dept. of Environmental Resources, Shangri-La Dam appears to be in good condition. (Author)

AD-A078 887/7 MF A01
Gai Consultants Inc Monroeville PA
National Dam Inspection Program. Bellwood Dam, (NDI I.D. Number PA-00524, Pennder I.D. Number 7-3) Susquehanna River Basin, Bells Gap Run, Blair County, Pennsylvania. Phase I Inspection Report.
Jun 79, 85p
Contract DACW31-79-C-0013
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Bellwood Dam is an earth and rockfill embankment approximately 1300 feet in length, including spillway, with a measured height of 61 feet and a top width of about 20 feet. Both the upstream and downstream face are protected by stone fill. The embankment contains a cut-off trench and concrete cut-off wall keyed into rock along the entire length. In addition, grouting was conducted along 3-foot centers below the cut-off wall. The facility is served by a concrete chute spillway with an ogee-shaped weir and a crest length of 100 feet located at the right abutment. In addition, the facility is equipped with a 36-inch diameter cast iron pipe blowoff line and a 16-inch diameter cast iron pipe supply line, both controlled by gate valves housed in a masonry structure at the downstream toe of the embankment. A 6-inch diameter line off the supply line provides a continuous flow for downstream requirements.

AD-A078 888/5 MF A01
O'Brien and Gere Engineers Inc Philadelphia PA
Justin and Courtney Div
National Dam Safety Program. Grace Mine Traillngs Dam, (NDI-PA00715, PA DER 6-445) Delaware River Basin, Tributary to Hay Creek, Berks County, Pennsylvania. Phase I Inspection Report.
Aug 79, 72p
Contract DACW31-79-C-0010
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Grace Mine Trailings Dam is an earth and rockfill embankment approximately 2,000 feet long with a maximum height of 145 feet. The dam was constructed to impound iron ore tailings slurry pumped from a nearby iron mine operated by the Bethlehem Mines Corporation. The reservoir area provides storage space for the trailings which settle out of the slurry to leave a clear water lake. A homogeneous, impervious earth embankment was originally constructed in 1956-1957 to Elevation 600. Two extension dikes were constructed to Elevation 620 in 1976-1977. These dikes are located several hundred feet to the south of the right abutment. The side slopes were 3 horizontal to 1 vertical (3H:1V) from the base of the dam to Elevation 540 and 2.5H:1V from Elevation 540 to the top of the dam.

AD-A078 896/8 MF A01
Berger Associates Inc Harrisburg PA
National Dam Inspection Program. Saddle Lake Dam (NDS Number PA-00895, DER Number 66-56), Susquehanna River Basin, Wyoming County, Pennsylvania. Phase I Inspection Report.
Aug 79, 66p
Contract DACW31-79-C-0012
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The Saddle Lake Dam is a homogeneous earthfill structure with an earthfilled cutoff trench at the center of the embankment foundation. The top of the dam embankment is 24 feet above the streambed elevation. The main embankment is 350 feet in length to where it meets a natural high knoll at its right abutment. The knoll is about 100 feet across beyond which a second embankment section has been constructed extending approximately another 400 feet to the right where it abuts the natural ground surface. An uncontrolled concrete triangular weir spillway is located at the left abutment of the main embankment. The approach to the spillway is through a 45 foot wide approach channel from the left side of the reservoir. This channel is a 90 deg curved section about 200 feet in length. The spillway outlet channel has a concrete slab and 2H to 1V sloped concrete side walls and extends 57 feet downstream from the crest of the weir. Beyond this point, the channel is paved with riprap including a stilling basin about 200 feet further downstream.

AD-A078 897/6 MF A01
Berger Associates Inc Harrisburg PA
National Dam Inspection Program. Bear Creek Lake Dam (NDI Number PA-00610, DER Number 13-98, Carbon County, Pennsylvania. Phase I Inspection Report.
Aug 79, 69p
Contract DACW31-79-C-0012
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The Bear Creek Lake Dam is a zoned earthfill dam having a clay core and upstream clay blanket at the base of the embankment. The embankment length is 500 feet and its height is 35 feet above the streambed. A concrete cutoff wall was installed over a distance of 200 feet along the centerline of the embankment, refer to Appendix F, Plate V. This wall extends from a minimum of three feet below the rock surface to five feet above the rock surface. The outer shell of the embankment consists of rolled select fill. A rock toe drain is provided at the downstream toe of the embankment. This drain is founded on a 12-inch thick gravel filter. The upstream embankment slope is riprapped to a vertical distance of 10 feet below the crest of the dam. The spillway is an uncontrolled concrete ogee section located at the left abutment of the embankment. The spillway outlet channel discharges directly to the natural stream.

AD-A078 898/4 MF A01
Gai Consultants Inc Monroeville PA

National Dam Inspection Program. Gallo Dam (NDS I.D. Number PA-00233, Pender I.D. Number 56-91) Ohio River Basin, Beaverdam Run, Somerset County, Pennsylvania. Phase I Inspection Report.
Sep 79, 91p
Contract DACW31-79-C-0013
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Gallo Dam is a 29-foot high earth embankment approximately 690 feet long (including spillway). The embankment is reportedly comprised of 3 sections which include an impervious core, a semi-pervious upstream section and a pervious downstream section. The facility is served by a chute channel spillway, with discharges controlled by a free overfall, concrete weir structure. The spillway is located near the right abutment, and has a crest length of 39 feet. In addition, the facility is equipped with a 18-inch diameter steel pipe encased in concrete used as a low level outlet as well as a 16-inch diameter steel siphon which was installed in 1973.

AD-A078 899/2 MF **A01**
Gai Consultants Inc Monroeville PA
National Dam Inspection Program. Pottsgrove Dam (NDI I.D. Number PA-00527, Penndr I.D. Number 7-19) Susquehanna River Basin, Kettle Creek, Blair County, Pennsylvania. Phase I Inspection Report.
Jun 79, 125p
Contract DACW31-79-C-0013
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Pottsgrove Dam is a 37-foot high earth embankment approximately 900 feet long. The embankment is comprised of three sections of which the center section is about 560 feet long. The left and right sections are approximately 90 and 250 feet long (including spillway), respectively, and each form an angle of about 60 degrees with the center section. The facility is served by a concrete and masonry chute channel spillway with an uncontrolled concrete, ogee-shaped weir located within the right embankment section. The spillway has a crest length of 64 feet and is 4.6 feet deep (below wingwall level). In addition, the facility is equipped with a 16-inch diameter cast iron pipe (C.I.P.) blowoff line, and 10- and 12-inch diameter C.I.P. supply lines controlled by gate valves housed within a structure located at the downstream toe of the embankment. (Author)

AD-A078 900/8 MF **A01**
Gai Consultants Inc Monroeville PA
National Dam Inspection Program. Beaver Dam (NDI I.D. Number PA-00453, Penndr I.D. Number 65-7), Ohio River Basin, Beaver Run, Westmoreland County, Pennsylvania. Phase I Inspection Report.
Jun 79, 140p
Contract DACW31-79-C-0013
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Beaver Dam is an earth embankment approximately 32 feet high and 385 feet long (including spillway). The dam is constructed with a masonry spillway located about 35 feet left of the right abutment. The crest of the spillway is 100 feet long and about 11 feet below the top of its wingwalls. Based on a visual inspection, operational history, and available engineering data, the dam is consisered to be in poor condition. The defunct facility has been essentially abandoned since 1952 and its reservoir is sediment filled. Results of the hydrologic and hydraulic analysis indicate that the facility is capable of passing and/or storing only 36 percent of the PMF without embankment overtopping. Structural deficiencies noted by the inspection team included substantial embankment overgrowth, an access road cut through the embankment near the left abutment, cracking of the masonry spillway wingwalls, and a sediment filled reservoir. Due to the seriously inadequate spillway and overall poor condition, the facility is considered unsafe but non-emergency as failure is not considered imminent.

AD-A078 901/6 MF **A01**
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. PA-467 Dam (NDI I.D. Number PA-00054, DER I.D. Number 58-131, SCS I.D. Number PA-467) Susquehanna County Commissioners, Susquehanna River Basin, Tributary to Martins Creek. Susquehanna County, Pennsylvania. Phase I Inspection Report,
Frederick Futchko. Aug 79, 86p
Contract DACW31-79-C-0015
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The dam consists of a zoned, earthfill embankment that is 590 feet long and 52 feet high at its maximum section. The main spillway is a drop spillway located near the right abutment of the dam. It consists of a concrete riser connected to a 30-inch diameter reinforced concrete pipe under the embankment. The auxiliary spillway is an excavated channel along the left abutment of the dam. It is a grass-linked excavation in earth. Based on visual inspection, available records, calculations and past operational performance, PA-467 Dam is judged to be in good condition. The existing spillway can pass the Probable Maximum Flood(PMF) without overtopping of the dam. The spillway capacity is rated as adequate. There is a slope stability analysis for the embankment, and it indicates that the embankment has adequate factors of safety. There is no evidence of significant problems threatening the embankment.

AD-A078 902/4 PC **A05**/MF **A01**
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. Lake Montrose Dam, (NDI ID Number PA-00047 DER ID Number 58-20). Susquehanna River Basin. Snake Creek, Susquehanna County, Pennsylvania. Phase I Inspection Report.
Aug 79, 81p
Contract DACW31-79-C-0015
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Based on visual inspection (18 July 1979), available records, calculations, past operational performance, and according to criteria established for these studies, Lake Montrose Dam is judged to be unsafe, nonemergency, because the spillway capacity is rated as seriously inadequate. The existing spillway can pass only 17% of the Probable Maximum Flood (PMF) without overtopping of the dam. Based on the type of construction and the condition of the dam, it is judged that the dam could not withstand the depth and duration of overtopping that would occur for the PMF or the 1/2 PMF. Failure of the dam would cause an increased hazard to loss of life downstream. As a whole, the dam is judged to be in poor condition. The spillway has undergone a gradual structural failure that has resulted in a reduction of spillway capacity. Continuation of the gradual failure, or perhaps a sudden failure, appears to be possible. There are no functional outlet works for the dam. Maintenance of the project is inadequate. There is no program for regular inspection of the dam.

AD-A078 903/2 PC **A05**/MF **A01**
Woodward-Clyde Consultants Plymouth Meeting PA
National Dam Inspection Program. Cadjaw Dam, (NDS I.D. Number PA-00168, DER I.D. Number 64-10). Delaware River Basin, Wayne County, Pennsylvania. Phase I Inspection Report.
Dec 78, 89p
Contract DACW31-79-C-0017

Cadjaw Pond Dam is owned by the Honesdale consolidated Water Co., and was once used as an emergency water supply source for the city and surrounding area. Currently, the dam has no immediate purpose for the water company except in the extreme event that water is needed as a supplemental source. The dam is in an obvious state of disrepair and severely neglected. Further, there are a large number of unknowns concerning the overall stability of the embankment. Until such time as appropriate studies are made and needed repairs performed, the dam should be considered unsafe. Based on this, seven recommendations are presented with the anticipation that it is desired to keep the structure and reservoir in service. If there is no need to maintain this structure, or if rehabilitative costs are excessive, an alternate solution would be to breach the structure under the guidance of a Professional Engineer, and allow the water level to reach the preexisting level of the natural lake.

AD-A078 907/3 PC **A02**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Hydraulics Lab
Stilling Basins for Outlet Works.
Final rept.,
Thomas E. Murphy. Oct 79, 15p Rept no. WES/MP/HL-79-8

Low and intermediate flows in a stilling basin for a single conduit outlet may form an eddy in the basin. This eddy may entrap rocks and debris and result in abrasion and impact damage to the basin. This problem occurs where the invert of the conduit outlet portal is 'low' with respect to tailwater. The invert of the outlet portal of a conduit is 'low' with respect to tailwater, and eddy problems can be expected, if for any operating discharge the d sub 2 curve intersects the tailwater for that discharge in the transition between the conduit and the stilling basin proper at a section where the slope of the apron is flatter than 1V on 6H. (Author)

AD-A078 911/5 MF **A01**
Kimball (L Robert) and Associates Ebensburg PA
National Dam Inspection Program. Lyman Run Dam. NDS I.D. Number PA-29, DER I.D. Number 53-59, Commonwealth of Pennsylvania, Department of Environmental Resources. Susquehanna River Basin, Lyman Run, Potter County, Pennsylvania. Phase I Inspection Report.
Sep 79, 85p
Contract DACW51-79-C-0009
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Lyman Run Dam is an earthfill dam 920 feet long and 50 feet high. The top width of the dam is 14 feet. The spillway is located at the left abutment of the dam and consists of a concrete lined chute. The weir consists of a 125 foot long concrete ogee. The inspection and review of data of Lyman Run Dam did not reveal any problems which require emergency action. The dam appears to be in good condition with the exception of the seepage, well maintained and safely operated. Lyman Run Dam is a high hazard-intermediate size dam. The Spillway Design Flood is the PMF(Probable Maximum Flood). The spillway and reservoir are capable of controlling the PMF. Based on criteria established by the Corps of Engineers, the spillway is termed adequate.

AD-A078 912/3 MF **A01**
Gai Consultants Inc Monroeville PA
National Dam Inspection Program Upper Bridgeport Dam NDI I.D. Number PA-00465 Pender I.D. Number 65-6. Ohio River Basin, Jacobs Creek, Westmoreland County, Pennsylvania. Phase I Inspection Report.
Jun 79, 134p
Contract DACW31-79-C-0013
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Upper Bridgeport Dam is an earth embankment approximately 1,020 feet long (including spillways), with a maximum height of 21 feet. The embankment is divided into three sections by two spillways. The service spillway is a combination masonry and concrete trapezoidal-shaped weir structure with a 101-foot long crest located about 140 feet from the left abutment. The emergency spillway is a concrete broad-crested weir structure with a 250-foot crest length located about 320 feet to the left of the right abutment. Based on the visual inspection, operational history, and available engineering data, the dam is considered to be in poor condition. The facility has been essentially abandoned by the current owner and has not been in operation or maintained since 1972. Results of the hydrologic and hydraulic analysis indicate that the facility can accommodate approximately 20 percent of the PMF before overtopping of the embankment occurs. Since the dam's hazard rating is high, and embankment failure would result in an

increase in the potential for loss of life downstrean from the dam, the present spillway system is assessed as being seriously inadequate.

AD-A078 913/1 MF **A01**
O'Brien and Gere Engineers Inc Philadelphia PA Justin and Courtney Div
National Dam Inspection Report. Marcel Lake Dam. NDI - PA 00402, PA DER 52-149. Delaware River Basin, Dingmans Creek, Pike County, Pennsylvania. Phase I Inspection Report.
Mar 79, 80p
Contract DACW31-79-C-0010
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Marcel Lake Dam is an earth fill embankment with a clay core. The embankment is approximately 675 feet long with a maximum height of about 23 feet. A 60-foot long overflow spillway is located between the embankment and the left abutment. The dam was designed with 6.5 feet of freeboard above the spillway crest. Training walls extend a short distance upstream and downstream of the spillway, and riprap slope protection is provided along the banks of the approach channel. A reinforced concrete apron extends approximately 20 feet downstream of the spillway. The apron varies in width, from 60 feet at the base of the spillway to 25 feet at the junction with a grouted riprap lined channel. The channel has a 25-foot base width and side slopes of 1 horizontal to 1 vertical (1H:1V), and extends about 150 feet downstream of the apron. A 30-inch corrugated metal pipe encased in concrete is provided as a low level outlet. Discharne through the pipe is controlled by a handwheel operated sluice gate on the outlet structure. The outlet structure is located at the toe of the upstream face of the embankment. (Author)

AD-A078 928/9 PC **A04/MF A01**
Kimball (L Robert) and Associates Ebensburg PA
National Dam Inspection Program. Hunters Lake Dam (NDS ID Number PA-356 DER ID Number 57-1), Susquehanna River Basin, Trout Run, Sullivan Court, Pennsylvania. Phase I Inspection Report.
R. Jeffrey Kimball. Aug 79, 70p
Contract DACW31-79-C-0009
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Hunters Lake Dam is an earthfill dam 450 feet long and 27 feet high. The upstream slope is 3H:1V with concrete paving blocks acting as slope protection. The upstream slope in the lower portion is 3.5H:1V. The downstream slope is 2.5H:1V and grassed. The embankment is homogeneous with a rock toe. Upstream of the dam is a concrete control tower which contains the principal spillway. Flow enters the concrete spillway tower and drops down the tower and into a 48 inch reinforced concrete pipe to an impact basin at the toe of the dam. In addition, the concrete spillway tower has a 4 foot by 5 foot sluice gate to act as a reservoir drain. The emergency spillway is located in a natural saddle at the opposite end of the reservoir. The emergency spillway has a 300 foot long concrete slab. (Author)

AD-A078 929/7 PC **A04/MF A01**
Woodward-Clyde Consultants Plymouth Meeting PA
National Dam Inspection Report. Goldsboro Dam (NDS ID PA 00149, DER ID 64-148), Delaware River Basin, Wayne County, Pennsylvania. Phase I Inspection Report,
John Boschuk, Jr., and John Henry Frederick, Jr. Jul 79, 61p
Contract DACW31-79-C-0017
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Gouldsboro Dam is owned by the Pennsylvania Fish Commission. The dam abuts a higher, wider railroad embankment. According to DER files, Gouldsboro Dam was built in 1895 and at least the outlet portion of the drop inlet discharge conduit was built in 1912. The facility is considered to be in fair condition and classified as a 'Significant' hazard potential structure. Hydrologic and hydraulic calculations indicate the dam will not be overtopped during the Probable Maximum Flood. Excess flows will pass over natural ground at the northeast end of the lake across Route 507 at Gouldsboro, Pennsylvania, and eventually into Snag Pond. Visual inspection of the dam and reservoir detected no significant problems other than an unserviceable drain gate. Since the dam and railroad embankment have a combined crest width on the order of 85 feet and would not overtop during large storms, it is judged that the stability of the embankment is adequate.

AD-A078 930/5 PC **A06/MF A01**
Woodward-Clyde Consultants Plymouth Meeting PA
National Dam Inspection Program. Lake Naomi Dam (NDS ID Number PA 00777 DER ID Number 45-1), Delaware River Basin, Tunkhannock Creek, Monroe County, Pennsylvania. Phase I Inspection Report,
John Boschuk, Jr. Jul 79, 104p
Contract DACW31-79-C-0017
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Lake Naomi Dam originally built in 1895, is owned by the Pocono Pines Corp. and serves as a recreation lake for the organization. The dam is classified as a 'Significant' hazard structure based on its potential to cause extensive property damage downstream and the remote chance for loss of life in the event of failure. The dam is also classified as an 'Intermediate' size dam by virtue of its 1,492 acre-foot normal storage capacity. On the basis of the visual inspection on 10 May 1979, and available documentation, the dam and its appurtenant structures are considered to be in good condition. Specifically, the inspection of the dam detected no significant problems with the embankment. The main spillway was assessed to be in fair condition. The auxiliary spillway, although not used very often, showed signs of leakage through the downstream toe and appears highly susceptible to erosion based on the visual inspection. Since the very limited design documentation and visual inspection was insufficient to evaluate the stability of the dam and its appurtenant structures, additional investigations are required for a comprehensive evaluation.

AD-A078 931/3 PC **A05/MF A01**
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. Humboldt Dam (NDI ID Number PA-00646 DER ID Number 40-61), Susquehanna River Basin, Wolffs Run, Luzerne County, Pennsylvania. Phase I Inspection Report,
Albert Charles Hooke. May 79, 95p
Contract DACW31-79-C-0015
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Humboldt Dam is a homogeneous earthfill embankment with a masonry core-wall. The embankment is 974 feet long and 41 feet high at maximum section. A masonry gravity retaining wall, which acts as the spillway training wall, is at the right end of the embankment. The outlet works, which is near the middle of the embankment, consists of a masonry and corrugated metal intake structure with sluice gates, a 12-inch diameter cast-iron pipe(CIP), and a valve house at the toe of the dam. The intake structure is located on the upstream slope of the embankment; a bridge extends to it. Water supply pipes also extend from the intake structure. The masonry gravity spillway is at the right abutment of the dam. Its crest is 3.0 feet below the design elevation of the top of the dam and is 33.0 feet long. The spillway channel has a variable bottom width and a masonry gravity training wall on the left. The spillway channel extends along the right side of the valley.

AD-A078 932/1 PC **A06/MF A01**
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. Dam G, (NDI ID Number PA-00643 DER ID Number 40-14), Delaware River Basin, Dreck Creek, Luzerne County, Pennsylvania. Phase I Inspection Report,
Albert Charles Hooke. May 79, 101p
Contract DACW31-79-C-0015
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Dam G is a homogeneous earthfill embankment with a concrete core-wall. The embankment is 490 feet long and 19 feet high at maximum section. There are two outlet works at the dam. The first outlet works, which is near the right end of the embankment, consists of a concrete intake structure, two 24-inch diameter cast-iron pipes, and a valve house. This outlet works is connected to the water supply system. The second outlet works, which is near the left end of the dam, is similar to the first except it consists of a single 24-inch diameter pipe. The second outlet works provides the emergency drawdown capability. The concrete chute spillway is at the left abutment of the dam. Its crest is 3.0 feet below the design elevation of the top of the dam and is 75 feet long. The approach channel is short and concrete paved. The exit channel is a continuation of the chute. A bridge extends across the spillway crest. It is supported by two piers.

AD-A078 947/9 PC **A06/MF A01**
Baker (Michael) Jr Inc Beaver PA
National Dam Inspection Program. Boydstown Dam (NDI Number PA-00270 Penn DER Number 10-1), Ohio River Basin, Connoquenessing Creek, Butler County, Pennsylvania. Phase I Inspection Report,
Chuan Yuan Chen. Aug 79, 110p
Contract DACW31-79-C-0011
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Boydstown Dam is a diaphragm earthfill embankment approximately 28 feet high (maximum) and 330 feet long. The spillway is located at the left abutment of the dam. It is uncontrolled, and the broad-crested weir is 60 feet long (perpendicular to flow). An analysis indicated that the spillway will pass only 30 percent of the required Probable Maximum Flood before overtopping will occur. As a result of this analysis and others, the spillway is considered 'seriously inadequate.' The overall condition of the dam was assessed to be very poor because the upper half of the spillway is in such a deteriorated condition that significant damage to the structure may occur if large flows were to pass through the spillway. In addition, several features of the dam do not meet current design standards; the 7 foot crest width, the lack of an internal drainage system, the absence of positive cut-offs along the outlet and water supply pipes, and the lack of information concerning the details and condition of the outlet works.

AD-A078 949/5 PC **A05/MF A01**
D'Appolonia Consulting Engineers Inc Pittsburgh PA
National Dam Inspection Program. Storage Dam (NDI I.D. Number PA-388 DER I.D. Number 24-47), Ohio River Basin, Whetstone Branch of Little Toby Creek, Elk County, Pennsylvania. Phase I Inspection Report,
Lawrence D. Anderson. Jun 79, 76p
Contract DACW31-79-C-0014
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Storage Dam consists of an earth embankment approximately 500 feet long with a maximum height of 36 feet from the downstream toe and a crest width of approximately 15 feet. The appurtenant structures of the dam consist of a combined primary and emergency spillway located on the left abutment (looking downstream) and outlet works near the right abutment. Based on the evaluation of the existing conditions, the condition of Storage Dam is considered to be good. Numerous seeps were observed along the left abutment, but these seeps are not considered to be a threat to the integrity of the embankment. However, a slump and an associated wet area were observed along the toe of the dam near the left abutment. This condition should be investigated and necessary repairs performed. The flood discharge capacity of the Storage Dam spillway was evaluated according to the recommended procedure and it was found to be 40 percent of the probable maximum flood (PMF) without overtopping the embankment. Therefore, according to the recommended criteria, the flood discharge capacity of the dam is classified to be inadequate.

AD-A078 963/6 PC **A04/MF A01**
O'Brien and Gere Engineers Inc Philadelphia PA Justin and Courtney Div

National Dam Inspection Report. Boyertown Reservoir Dam (NDI-PA 00707) (PA DER 6-344) Delaware River Basin, Popodickon Creek, Berks County, Pennsylvania. Phase I Inspection Report,
John J. Williams. Aug 79, 71p
Contract DACW31-79-C-0010
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Boyertown Reservoir Dam is an earth and rockfill embankment with a concrete corewall and a 20-foot wide, broad-crested, concrete spillway. The upstream portion of the dam is rolled earth embankment; the downstream section is earth and rockfill. The dam is approximately 620 feet long with a maximum height of 55 feet and impounds a reservoir with a normal pool storage capacity of 105 acre-feet. The dam is located on Popodickon Creek and serves as a source of water supply for Boyertown, which is situated approximately 2.5 miles downstream (east) of the dam. The Spillway Design Flood (SDF) for this 'Intermediate' size, 'High' hazard dam is the Probable Maximum Flood (PMF). The spillway is capable of discharging 37 percent of the PMF without overtopping of the embankment. The spillway is classified as 'Inadequate'. The spillway is not classified as 'Seriously Inadequate' because the depth and duration of overtopping are not considered sufficient to cause a failure of the embankment at 50 percent of the PMF. Based on the visual observations and review of the information obtained from the Pennsylvania Department of Environmental Resources, Division of Dam Safety, Boyertown Dam is considered to be in good condition.

AD-A078 964/4 PC **A04**/MF **A01**
O'Brien and Gere Engineers Inc Philadelphia PA Justin and Courtney Div
National Dam Safety Program. Township Line Dam (NDI-PA 00625, PA DER 15-266) Delaware River Basin, East Branch of Chester Creek, Chester County, Pennsylvania. Phase 1 Inspection Report,
John J. Williams. Aug 79, 65p
Contract DACW31-79-C-0010
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Township Line Dam is an earth embankment approximately 530 feet long with a height of 34 feet and crest width of 10 feet. The dam, originally constructed to impound and supply water for the Borough of West Chester, is presently being used for recreation, flood abatement and maintenance of a minimum discharge into the East Branch of Chester Creek. The concrete Ogee spillway has a crest width of 50 feet and is located at the south dam abutment. The spillway, for this 'Intermediate' size, 'High' hazard dam, is capable of discharging 48 percent of the PMF without overtopping of the earth embankment. A review of the hydrologic analysis indicates that the embankment would be overtopped by 0.15 feet for about 2 hours during a flood equal to 50 percent of the PMF. It is considered unlikely that the dam would fail during this event; therefore, the spillway is classified as 'Inadequate', but not 'Seriously Inadequate'. Based upon visual observations, review of the information obtained from the Pennsylvania Department of Environmental Resources, Division of Dam Safety, and conversations with the Owner's representative, Township Line Dam is considered to be in fair condition. However, the detection of potentially unstable conditions at this site was severely restricted due to thick vegetation covering the entire embankment. Certain conditions require further investigations, maintenance, or monitoring.

AD-A078 965/1 PC **A05**/MF **A01**
O'Brien and Gere Engineers Inc Philadelphia PA Justin and Courtney Div
National Dam Safety Program. Crum Creek Dam (NDI-PA-00350, PA-DER-23-20), Delaware River Basin, Crum Creek, Delaware County, Pennsylvania. Phase I Inspection Report.
Aug 79, 91p
Contract DACW31-79-C-0010
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Crum Creek Dam is a masonry gravity structure (cyclopean concrete) about 610 feet long and 25 feet high. A 210-foot long ungated overflow spillway is located along the length of the dam about 80 feet from the right abutment. The dam, which is classified as 'High' hazard, has a Spillway Design Flood (SDF) equal to the Probable Maximum Flood (PMF). A review of the results of the hydrologic and hydraulic analyses indicates that the spillway is capable of passing about 23 percent of the PMF. The spillway is classified as 'Inadequate' for passing the PMF; however, the spillway is not considered 'Seriously Inadequate' since the hazard potential due to a failure of the dam is not significantly greater than the hazard without a failure of the dam. Stability analyses were performed for both the overflow and non-overflow sections for the anticipated range of loading conditions. A review of the results indicates that the resultant of forces is located outside the middle third of the base width for 50 percent of the PMF, PMF and normal pool with ice loading conditions. Based on visual observations, review of the information provided by the Pennsylvania Department of Environmental Resources (DER), Division of Dam Safety, and conversations with the Owner's representative, Crum Creek Dam appears to be in good condition.

AD-A078 966/9 PC **A04**/MF **A01**
D'Appolonia Consulting Engineers Inc Pittsburgh PA
National Dam Inspection Program. Raccoon Creek State Park Dam (NDI-ID Number PA-262, DER-ID Number 4-34), Ohio River Basin, Traverse Creek, Beaver County, Pennsylvania. Phase I Inspection Report,
Lawrence D. Andersen. Jun 79, 71p
Contract DACW31-79-C-0014
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Raccoon Creek State Park Dam consists of an earth embankment approximately 960 feet long with a maximum height of 45 feet from the downstream toe and a crest width of 14 feet. The flood discharge facilities for the dam consist of a combined primary and emergency spillway located on the right abutment (looking downstream). The spillway structures of the dam consist of a concrete ogee overflow section and a trapezoidal concrete-lined spillway discharge channel which terminates in a concrete-lined stilling basin at the toe level of the dam near the right abutment. Based on the evaluation of the existing conditions, the condition of Raccoon Creek State Park Dam is considered to be good. No conditions were noted at this time that would significantly affect the structural performance of the dam. The flood discharge capacity of Raccoon Creek State Park Dam was evaluated according to the recommended procedure and was found to pass 90 percent of the probable maximum flood (PMF) without overtopping the embankment. Therefore, according to the recommended criteria, the flood discharge capacity of the dam was classified to be inadequate.

AD-A078 967/7 PC **A05**/MF **A01**
Kimball (L Robert) and Associates Ebensburg PA
National Dam Inspection Program. Lake Mokoma Dam (NDS-ID Number PA-359, DER ID Number 57-3) Mill Creek, Sullivan County, Pennsylvania. Phase I Inspection Report.
Sep 79, 79p
Contract DACW31-79-C-0009

Lake Mokoma Dam consists of an earth embankment constructed over a timber crib. The outlet works is located approximately 100 feet to the left of the emergency spillway and consists of a wet well, valve and pipe. The emergency spillway is located on the right abutment and consists of a concrete lined chute. The spillway is 68.5 feet long with a concrete pier in the middle of the spillway supporting a bridge over the spillway. The spillway exit channel is approximately 100 feet long and consists of a trapezoidal shaped concrete chute. The inspection and review of data of Lake Mokoma Dam did not reveal any problems of any emergency nature. The dam appears to be in fair condition with many deficiencies. The existing spillway and reservoir are capable of passing approximately 15% of the PMF (Probable Maximum Flood). Based upon criteria established by the Corps of Engineers, the spillway is termed seriously inadequate. As a result of the seriously inadequate spillway, the dam is considered an unsafe non-emergency dam.

AD-A078 968/5 PC **A06**/MF **A01**
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. Marshwood Dam (NDI ID Number PA-00365, DER ID Number 35-88), Susquehanna River Basin, Little Roaring Brook, Lackawanna County, Pennsylvania. Phase I Inspection Report.
Feb 79, 105p
Contract DACW31-79-C-0015
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Marshwood Dam is two homogeneous earthfill embankments with masonry core-walls. The dam was built in a natural saddle. The embankments impound water within the saddle. The dam has a main spillway and an auxiliary spillway. The main spillway is located at the right abutment of the South Embankment. It has a sharp-crested concrete weir with a crest length of 100 feet. The auxiliary spillway is a canal about 300 feet left of the South Embankment. Based on visual inspection, available records, calculations and past operational performance, Marshwood Dam is judged to be in fair condition. The spillway can pass 65 percent of the Probable Maximum Flood (PMF) without overtopping of the dam. The spillway capacity is rated as inadequate. This rating is dependent on implementation of some of the recommendations herein. If the low areas on the embankments were raised 0.6 foot to the design elevation, the spillway can pass 80 percent of the PMF. The spillway capacity would still be rated as inadequate.

AD-A078 969/3 PC **A05**/MF **A01**
D'Appolonia Consulting Engineers Inc Pittsburgh PA
National Dam Inspection Program. Mammoth Lake Dam (NDI ID Number PA-466, DER ID Number 65-130), Ohio River Basin, Sewickley Creek, Westmoreland County, Pennsylvania. Phase I Inspection Report,
Lawrence D. Andersen. Jun 79, 76p
Contract DACW31-79-C-0014
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Based on the evaluation of the conditions existing April 9 and May 25, 1979, the condition of Mammoth Lake Dam is considered to be good. The only two conditions noted which would require attention at this time are the filling of the erosion ditches on each side of the spillway structure and cleaning the debris from the outlet works discharge structure. The flood discharge capacity of Mammoth Lake Dam was found to be within the recommended capacity range of the 100-year flood to one-half of the probable maximum flood (PMF) relative to its size and hazard classification. Considering the 15-foot height of the dam is within the middle one-third of the zero to 25-foot height size classification range, the spillway capacity of 4770 cfs is rated to be adequate.

AD-A078 970/1 PC **A05**/MF **A01**
Baker (Michael) Jr Inc Beaver PA
National Dam Safety Program. Glades Dam (NDI Number PA-00804, Penn DER Number 10-72), Ohio River Basin, South Branch of Slippery Rock Creek, Butler County, Pennsylvania. Phase I Inspection Report,
Chuan Yuan Chen. Aug 79, 81p
Contract DACW31-79-C-0011

Glades Dam is a homogeneous earthfill dam with a maximum height of 24 feet and a crest length of 960 feet. The dam, owned and operated by the Pennsylvania Game Commission, is used primarily for waterfowl protection. The spillway, consisting of a concrete ogee overflow with a slotted flip bucket energy dissipator, is located at the left abutment of the dam. The crest length is 100 feet. The discharge channel is lined with riprap for 130 feet downstream from the flip bucket. The intake tower and 54 inch outlet conduit are located 400 feet from the left abutment of the dam. Two 3 foot by 5 foot sluice gates (El. 1197.0 feet and El. 1190.0 feet) are used to control the pool elevation. The 54 inch reinforced concrete pressure pipe outlet conduit has four cut-off collars on 26 foot centers along the upstream portion. A discharge basin is located at the downstream end of the outlet conduit.

AD-A078 971/9 PC **A05**/MF **A01**
Baker (Michael) Jr Inc Beaver PA

National Dam Safety Program. Kahle Lake Dam (NDI Number PA-00825, Penn DER Number 61-20), Ohio River Basin, Mill Creek, Venango County, Pennsylvania. Phase I Inspection Report,
Chuan Yuan Chen. Aug 79, 87p
Contract DACW31-79-C-0011

Kahle Lake Dam is a zoned, earthfill embankment with a maximum height of 45 feet and a total length between abutments of 1300 feet. The embankment has a crest width of 19 feet and side slopes of 3H:1V (Horizontal to Vertical) upstream and 2.5H:1V downstream. The upper 10 feet of the upstream slope is provided with 18 inch thick riprap for wave and ice protection. The auxiliary spillway, located in the left abutment, consists of a concrete weir, a concrete chute, and a stilling basin. The weir has an overall length of 81 feet with the crest elevation 6 feet below the top of dam. Flow over the weir discharges into a reinforced concrete chute. The chute width varies from 81 feet at the weir to 60 feet at the stilling basin. The bottom of the chute has a slope of 5H:1V and an overall length of 144.33 feet. Reinforced concrete training walls are provided from the weir to the end of the stilling basin.

AD-A078 972/7 PC **A05**/MF **A01**
Woodward-Clyde Consultants Plymouth Meeting PA
National Dam Inspection Program. New Kernsville Dam (NDS ID Number PA-00723, DER ID Number 6-434), Delaware River Basin, Schuylkill River, Berks County, Pennsylvania. Phase I Inspection Report,
John Boschuk, Jr., and John Henry Frederick, Jr. Jul 79, 78p
Contract DACW31-79-C-0017

The New Kernsville Dam, owned by the State of Pennsylvania, was completed in November 1949. Visual inspection (20 April 79) of the exposed sections of the dam and review of the limited available data indicate that New Kernsville Dam is in good condition. Since the entire spillway and bucket were submerged and could not be inspected, a complete visual assessment of the structure could not be performed. The factors of safety for the ogee section appear to be reasonable. The dam is classified as a 'High' hazard potential structure consistent with its potential to cause extensive property damage and possible loss of life in the event of abrupt failure. Based on the findings presented in this report, it is recommended that the bucket area along the downstream toe of the spillway should be periodically inspected, especially after periods of high flows to check for scour or deterioration of the toe. Joint deterioration at monolithic sections and below the walkway and nonoverflow section should be periodically inspected. If deterioration of these zones becomes excessive, they should be cleaned and patched.

PB80-122211 PC **A02**/MF **A01**
Virginia Highway and Transportation Research Council, Charlottesville.
Evaluation of the Performance of a Press-Lam Timber Bridge. Interim Report Number 1, Bridge Installation and Load Test.
Interim rept. 1 Mar-31 Jul 77,
Michael M. Sprinkel. Jul 77, 22p VHTRC-78-R2, FHWA/RD-79-S0916

This report describes the installation and load test of the world's first press-lam timber bridge superstructure. A five-man crew replaced the substandard steel stringer-timber deck superstructure on Rte. 610 over Little Stoney Creek in Shenandoah County with the press-lam superstructure in about four work days, and the road was closed for only eight hours. Results of the load tests conducted two weeks after the 17.5 ft. (5.33 m) span, 2-lane bridge was constructed suggest that the stringer live load distribution specified by AASHTO is conservative. The Research Council will inspect and load test the bridge periodically over a five-year period.

PB80-122633 PC **A09**/MF **A01**
PEDCo-Environmental, Inc., Cincinnati, OH.
EPA Utility FGD Survey: February-March 1979,
M. Smith, M. Melia, and T. Koger. Jul 79, 188p EPA/600/7-79/022D
Contract EPA-68-02-2603

See also PB-295 650, and PB-299 399.

The report is the second in a series of four generated by a new computerized data base system. The report differs from the previous series in that the scope of design data for operating FGD systems is vastly expanded, section formats are revised, and a new section includes operating particulate scrubbers. The report surveys utility FGD systems in the U.S. It summarizes information contributed by the utility industry, process suppliers, regulatory agencies, and consulting engineering firms. Systems are tabulated alphabetically by development status (operating, under construction, or in planning stages), utility company, process supplier, process, waste disposal practice, and regulatory class. It presents data on system design, fuel sulfur content, operating history, and actual performance. It includes unit by unit dependability parameters and discusses problems and solutions associated with the boilers and FGD systems. Process flow diagrams and FGD system economic data are appended.

PB80-123516 PC **A07**/MF **A01**
Systems Applications, Inc., San Rafael, CA.
Power Plant Impacts on Air Quality and Visibility: Siting and Emission Control Implications.
Final rept. Nov 78-Aug 79,
Douglas A. Latimer. 14 Aug 79, 130p EF79-101, EPA-230/11-79/001
Contract EPA-68-01-3947

The air quality and visibility impact of various sizes of power plants, which emit SO2 and NOx at various rates, was analyzed using analysis methods either recommended or likely to be accepted by the EPA. The impact of single power plant plumes and cumulative emissions on a regional scale were considered. Tentative conclusions are made regarding the air quality and visibility impacts of power plants individually and collectively throughout a region and the implications of these impacts for power plant sitings and emissions control.

PB80-123540 PC **A15**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Emission Standards and Engineering Div.
Automobile and Light-Duty Truck Surface Coating Operations-Background Information for Proposed Standards.
Sep 79, 330p EPA/450/3-79/030

Standards of performance to control Volatile Organic Compounds (VOC) from new, modified, and reconstructed automobile and light-duty truck surface coating operations are being proposed under Section 111 of the Clean Air Act. This document contains information on automobile and light-duty truck surface coating operations and VOC Emission Control Technology, as well as a discussion of the selected emission limitations and the supporting data and the alternatives which were considered. Environmental and economic impact analyses of the proposed standards are also included.

PB80-124191 PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Public Notification Guideline.
Final rept.,
Joseph Sableski, William Houck, and Inez Artico. Oct 79, 32p OAQPS-1.2-125R, EPA/450/2-79/005A

No abstract available.

PB80-124258 PC **A09**/MF **A01**
Environmental Sciences Research Lab., Research Triangle Park, NC.
Gridded Annual Pollutant Emissions East of the Rocky Mountains,
Terry L. Clark. May 79, 180p EPA/600/4-79/030

Annual pollutant emissions of particulates, sulfur dioxide, nitrogen oxides, hydrocarbons, and carbon monoxide from point and area sources are apportioned to 80-km grid squares on a 35 by 30 grid network. The grid network is a polar stereographic projection true to 60 degrees N. The domain of the network includes southern Canada and much of the United States east of the Rocky Mountains. Southern Texas and northern New England are omitted. In addition, the emissions of the five pollutants are apportioned to 20-km grid squares on a 40 by 40 grid network, which is a subset of the previously mentioned grid network. The domain of the 40 by 40 grid network encompasses the area roughly from Columbus, Ohio to Portland, Maine and from Richmond Virginia to Ottawa, Ontario. The emission data were obtained from the 1977 Environmental Protection Agency National Emissions Data System (NEDS) file as well as from data compiled by the Ontario Ministry of the Environment and Environment Canada. These emission inventories, the design of the gridding procedures, and the major source classifications responsible for much of the emissions are discussed. The emission grids are presented in both figure and tabular forms.

PB80-124688 PC **A05**/MF **A01**
Alaska Univ., Fairbanks. Inst. of Water Resources.
The Joint U.S.-Canadian Northern Civil Engineering Research Workshop, Held at Edmonton, Alberta on March 20, 1978,
Robert F. Carlson, and N. R. Morgenstern. 20 Mar 78, 84p ISBN-0-919058-16-7, IWR-96, NSF/RA-780691
Grant NSF-ENG76-22293
Prepared in cooperation with Alberta Univ., Edmonton. Boreal Inst. for Northern Studies.

Results of a workshop to assess North American civil engineering research are reported. The conference was prompted primarily by Canadian, U.S., and world concerns for future energy and mineral resources. Also, within recent years sufficient transportation and engineering facilities have become available for extensive engineering projects exemplified by the Alaska oil pipeline. In anticipation of expanded future research for engineering developments, attention focused on six major topics: ice and snow engineering, frozen ground engineering, municipal facilities, design and construction, resource and transportation facilities. Each topical group discussed the state-of-the-art of northern engineering, prospective developments, current and prospective research programs, research needs and priorities for the next decade, facilities for information transfer, and the current application of research knowledge. An appendix tabulates research and transportation facilities categorized according to research considerations.

PB80-124829 PC **A04**/MF **A01**
Industrial Environmental Research Lab., Research Triangle Park, NC.
EPA/IERL-RTP Pilot Electrostatic Precipitator - Selected Experiments, 1978.
Final rept. Jun 78-Jun 79,
D. W. VanOsdell, L. E. Sparks, G. H. Ramsey, and B. E. Daniel. Nov 79, 64p EPA/600/7-79/238

The report describes experiments with a pilot-scale electrostatic precipitator (ESP) at EPA/IERL-RTP. The ESP is a dedicated experimental tool, operated for experiments originated and designed both in-house and by EPA contractors. Five distinct test series, between March and October 1978, are described: precharger operation, ESP operating characteristics, reentrainment, parameter variation with position within ESP, and effects of humidity. The precharger test results were inconclusive; removal efficiency was 10-20% better with the precharger for most size ranges, but its operation was erratic. In the reentrainment test, sparking produced more and larger particulate than other reentrainment mechanisms. No size distribution change pattern was established. The study of flow, mass, and particle size as a function of sample probe position showed that parameter variations do exist; however, insufficient data was collected to fully establish the differences. In the study of the effects of humidity on collection efficiency, increased moisture had a strong impact on improved performance. Moisture lowered the particulate resistivity, allowing increased electrical fields. Efficiency correlated well with voltage in the form: P=6.59 x 10 to the 8th power x V to the -5.46 power where P=penetration, %, and V=voltage, kV. The correlation coefficient, r2, was 0.97.

PB80-124894 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).

Imported Fill for Earthworks: Case Studies of the Use of Waste Tips or Borrow-Pits,
P. T. Sherwood, and P. G. Roe. c1978, 32p
TRRL-SUPPLEMENTARY-411
Also pub. as ISSN-0305-1315.

This report describes a study that has been made of the benefits and disbenefits that have occurred in a number of road projects where waste materials were either used or considered for use as the source of bulk-fill materials. The case studies showed that where waste materials occur in close proximity to a road site their use should be considered because considerable environmental gains can be achieved. However, there is no simple solution to the question as to whether or not waste tips should be used in preference to borrow-pits as the source of bulk-fill material. Borrow-pits are not always environmentally harmful and the use of wastes can give rise to problems which may outweigh the benefits of using them. Each case must, therefore, be treated on its merits. (Copyright (c) Crown Copyright 1978.)

PB80-124969 PC **A04**/MF **A01**
PEDCo-Environmental, Inc., Cincinnati, OH.
Overview of Pollution from Combustion of Fossil Fuels in Boilers of the United States.
Final rept. Jan-Jun 79,
P. W. Spaite, and T. W. Devitt. Oct 79, 69p EPA/600/7-79-233
Contract EPA-68-02-2603

The report describes the fossil-fuel-fired boiler population of the U.S. It presents data on the number and capacity of boilers for categories most relevant to producing pollution. Information presented includes: type of fuel burned (coal, residual oil, distillate oil, natural gas); usage sector (utility, industrial, commercial); size category (less than 25 million Btu/hr, 25-250 million Btu/hr, greater than 250 million Btu/hr); and heat transfer configuration (water tube, fire tube, cast iron). Fuel consumption data are presented for each type of fuel burned in each usage sector. These data are used to estimate the amount of sulfur oxide, nitrogen oxide, and particulate air emissions produced by boiler operation. Other air pollutants are discussed qualitatively. Solid waste and water pollution from boiler operation is discussed generally.

PB80-125099 PC **A08**/MF **A01**
Biller (William F.), East Brunswick, NJ.
Studies in the Review of the Photochemical Oxidant Standard.
Final rept.,
William F. Biller. Jan 79, 173p EPA/450/5-79-004
Contract EPA-68-02-2589

Studies were performed in three areas for the Office of Air Quality Planning and Standards to support its review of the photochemical oxidants standard: (1) the desirability of changing from a photochemical oxidants to an ozone standard, (2) the suitability of alternate ways of expressing the standard and, (3) the assessment of health risks at alternate levels of the standard. From the first study it was concluded that a change to an ozone standard could lead to benefits in administering the standard with little or no loss in protection of the public health and welfare. The second study concluded that national ambient air standards should be expressed in a statistical form. A statistical form is more in accord with the actual behavior of pollutant concentrations in the atmosphere. In the third area the mathematical methodology was developed for estimating the risk that health effect thresholds for sensitive populations will be exceeded during a given period of time at alternate levels of the ambient air quality standard. The method quantitatively treats the uncertainties in health effects thresholds and the extreme concentration levels of pollutant to be experienced in the given time period.

PB80-125107 PC **A99**/MF **A01**
Corvallis Environmental Research Lab., OR.
The Bioenvironmental Impact of a Coal-Fired Power Plant, Fourth Interim Report, Colstrip, Montana, December, 1978.
Interim rept. Dec 75-Dec 77,
Eric M. Preston, and Thomas L. Gullett. Apr 79, 955p EPA/600/3-79/044
See also PB-251 162, and PB-280 326.

The EPA has recognized the need for a rational approach to the incorporation of ecological impact information into power facility siting decisions in the northern great plains. Research funded by the Colstrip, Coal-fired Power Plant Project is a first attempt to generate methods to predict the bioenvironmental effects of air pollution before damage is sustained. Pre-construction documentation of the environmental characteristics of the grassland ecosystem in the vicinity of Colstrip, Montana began in the summer of 1974. Since then, key characteristics of the ecosystem have been monitored regularly to detect possible pollution impacts upon plant and animal community structure. In the summer of 1975, field stressing experiments were begun to provide the data necessary to develop dose-response models for SO2 stress on a grassland ecosystem. These experiments involve continuous stressing of one acre grassland plots with measured doses of SO2 during the growing season (usually April through October). Results of the 1976 and 1977 field seasons' investigations are summarized in this publication. The six-year project will terminate in 1980 and a final report will be published after data analyses are complete.

PB80-125263 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
A Reappraisal of Ambient Conditions Satisfactory for Site Painting of Steel Bridges,
R. R. Bishop, and M. A. Winnett. c1978, 24p
TRRL-LR-839

Current codes, if rigidly enforced, preclude highway bridge painting on site throughout the winter and much of the spring and autumn in an average year. The temperature must be not less than 4C and the relative humidity not above 90%. As the real criterion is to avoid painting on wet surfaces a change of emphasis away from relative humidity measurements is suggested. A simple wetness detector has been developed using the principle of a resistance change between two electrodes in the presence of moisture. The complete system enabled readings of surface wetness, air and steel surface temperatures to be collected over monthly intervals on a battery operated chart recorder. The results of 14 months measurements on four structures is described. Steelwork sheltered by concrete decks on tall compositely constructed viaducts over land was dry for a very large proportion of the year. It is implied that the painting season for some structures could be extended. (Copyright (c) Crown Copyright 1978.)

PB80-125271 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Geometric Imperfections in In-Situ Concrete Highway Bridges,
B. O. Hall, S. J. Berrisford, and A. M. Thomas. c1978, 30p TRRL-LR-852

Geometric imperfections are inevitable in the construction of any highway bridge. Dimensional variations of in-situ concrete members, the flatness of nominally vertical, plane in-situ concrete walls, the flatness of in-situ concrete bridge decks and the cover to reinforcement have been measured in a few recently completed highway bridges. Current specification requirements for tolerance for these imperfections have been examined and methods have been developed for measuring them. It has been found that tolerances for these imperfections are not clearly defined in contract documents and that the variability measured on the few bridges which were surveyed was in some respects greater than that which is implied in the design assumptions. If tolerances are to be developed for use in the design and construction of highway bridges, more widespread surveys will be required. (Copyright (c) Crown Copyright 1978.)

PB80-125628 PC **A06**/MF **A01**
PEDCo-Environmental, Inc., Cincinnati, OH.
Survey of Flue Gas Desulfurization Systems: Lawrence Energy Center, Kansas Power and Light Co.
Final rept. Jul-Dec 78,
Bernard A. Laseke, Jr. Aug 79, 123p EPA/600/7-79/199B
Contract EPA-68-02-2603
See also PB-246 849.

This report describes the results of a survey of operational flue gas desulfurization (FGD) systems on coal-fired utility boilers in the United States. The FGD systems installed on Units 4 and 5 at the Lawrence Energy Center of the Kansas Power and Light Company is described in terms of design and performance. The FGD system installed on each unit consists of two parallel two-stage scrubber modules, each of which includes a rectangular, variable-throat rod-deck venturi scrubber arranged in series with a spray tower absorber. Each system is also equipped with slurry-hold tanks, mist eliminators, and in-line reheaters, as well as isolation and bypass dampers. The two systems share a common limestone storage and preparation facility and waste-disposal facility. These FGD systems represent a second generation design replacement of limestone furnace-injection and tail-end scrubbing systems which were originally installed on Units 4 and 5 in 1968 and 1971, respectively. The original systems operated approximately 27,000 hours and 23,000 hours on coal-fired flue gas for Units 4 and 5, respectively. The redesigned FGD system on Unit 4 went into service in early January 1977. The Unit 5 FGD system went into service on April 14, 1978.

PB80-126014 PC **A03**/MF **A01**
Arizona Dept. of Transportation, Phoenix.
Optimizing Maintenance Activities, Third Report. Shoulder Maintenance.
Summary rept.,
A. F. Stanley. May 77, 37p FHWA/TS-77/210
Contract DOT-FH-11-8604
Prepared in cooperation with Idaho Transportation Dept., Iowa State Dept. of Transportation, Ames, and West Virginia Dept. of Highways, Charleston.

This report summarizes the results of a cooperative Value Engineering Study of shoulder maintenance undertaken by the State Highway Agencies of Arizona, Idaho, Iowa and West Virginia under sponsorship of the Federal Highway Administration. The study was limited to unpaved shoulders. Implementation of the recommendations in the four study States would result in a total estimated improved service value in excess of $1,000,000 annually. Specific recommendations varied among the States according to local conditions. Among the recommendations are the use of larger trucks for hauling, use of side-discharge shoulder spreaders, modifications to the standard motor grader, and spot paving of shoulders in high maintenance locations.

PB80-126022 PC **A04**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Emission Standards and Engineering Div.
Standard Support and Environmental Impact Statement. Volume II: Promulgated Standards of Performance for Stationary Gas Turbines.
Sep 79, 64p EPA/450/2-77/017B
See also Volume 1, dated Sep 77, PB-272 422.

Standards of performance to control nitrogen oxides and sulfur dioxide emissions from new, modified, and reconstructed stationary gas turbines in the U.S. are being promulgated under section III of the Clean Air Act. This document contains information on the public comments made after proposal, EPA responses and differences between the proposed and promulgated standards.

PB80-127038 PC **A05**/MF **A01**
Canyon Research Group, Inc., Westlake Village, CA.
A Requirements Analysis Document for Transit Vehicle Wheelchair Lift Devices.
Final rept.,
Mark S. Sanders. Jun 78, 87p UMTA-CA-06-0101-79-1
Contract DOT-UT-60106T
See also PB-294 711.

The purpose of the document is to provide guidelines for the design and evaluation of wheelchair lift devices for public transit vehicles (buses and light rail vehicles). Included is an analysis of wheelchair and maneuvering dimensions and their impact on both the lift system and transit vehicle design. Much of the content deals with general safety considerations and vehicle interior design which are the same for ramp or lift devices. A total of sixty three (63) requirements and recommenda-

tions are presented covering the design and operation of the lift, the vehicle lift interface, the vehicle interior, and the reliability and maintainability of the system. In addition, the report discusses evaluation parameters needed to assess the cost of public transit lift devices.

PB80-128820 PC **A11/MF A01**
National Oceanic and Atmospheric Administration, Rockville, MD.
Federal Plan for Ocean Pollution Research, Development, and Monitoring, Fiscal Years 1979-83.
Aug 79, 230p NOAA-80010205
Prepared in cooperation with Interagency Committee on Ocean Pollution Research, Development, and Monitoring, Rockville, MD.; Federal Coordinating Council for Science, Engineering, and Technology, Washington, DC., and Office of Science and Technology Policy, Washington, DC.

Federal Plan No. 1 for Fiscal Years 1979-1983 is set forth in this report. The broad range of subject matter addressed by almost a thousand projects comprising the current $165 million Federal ocean pollution research, development, and monitoring efforts is described. A comprehensive statement of national needs and problems based on public and private sector input is presented. A general overview of ocean pollution problems in the waters of the U.S. is provided and the adequacy of the current Federal response to these problems is analyzed by problem area. Initial priorities are assigned to the research and development, and monitoring needs as identified.

PB80-130008 PC **A99/MF A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Volume I. Receptors -- Mammals -- Birds.
Annual rept.
Oct 78, 781p NOAA-79101602
See also report dated Mar 77, PB-280 934. Prepared in cooperation with Bureau of Land Management, Washington, DC.

As part of the Outer Continental Shelf Environmental Assessment Program this volume contains the following annual reports for the year ending March 1978: Baseline characterization of marine mammals in the Bering Sea: distribution and abundance; Seasonal distribution and relative abundance of marine mammals in the Gulf of Alaska; Seasonal distribution and abundance of bowhead and beluga whales in the Bering Sea and Arctic Ocean; Morbidity and mortality of marine mammals; Biology of the harbor seal, in the Gulf of Alaska; The natural history and ecology of the bearded seal and the ringed seal; Trophic relationships among ice inhabiting phocid seals; Identification, documentation and delineation of coastal migratory bird habitat in Alaska. Breeding bird use of the barrier islands in the northern Chukchi and Beaufort Seas; and Reproductive ecology.

PB80-130016 PC **A99/MF A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Volume II. Receptors -- Birds.
Annual rept.
Oct 78, 964p NOAA-79101603
See also PB-279 024. Prepared in cooperation with Bureau of Land Management, Washington, DC.

As part of the Outer Continental Shelf Environmental Assessment Program this volume contains the following annual reports for the year ending March 1978: Simulation modeling of marine bird population energetics, food consumption, and sensitivity to perturbation; Shorebird dependence on Arctic littoral habitats; The distribution, abundance and feeding ecology of birds associated with pack ice; Ecological studies in the Northern Bering Sea: birds of coastal habitats on the south shore of Seward Peninsula, Alaska; and Distribution and abundance of marine birds in coastal regions.

PB80-130024 PC **A99/MF A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Volume III. Receptors -- Birds.
Annual rept.
Oct 78, 912p NOAA-79101604
See also report dated March 77, PB-280 935. Prepared in cooperation with Bureau of Land Management, Washington, DC.

As part of the Outer Continental Shelf Environmental Assessment Program this volume contains the following annual reports for the year ending March 1978: Population dynamics and trophic relationships of marine birds in the Gulf of Alaska and southern Bering Sea. It also includes appendices on bird populations and ecology.

PB80-130032 PC **A99/MF A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Volume IV. Receptors -- Fish, Littoral, Benthos.
Annual rept.
Oct 78, 734p NOAA-79101605
See also PB-281 197. Prepared in cooperation with Bureau of Land Management, Washington, DC.

As part of the Outer Continental Shelf Environmental Assessment Program this volume contains the following annual reports for the year ending March 1978: Survey of the epifaunal invertebrates of the southeastern Bering Sea; The distribution, abundance, diversity and productivity of the western Beaufort Sea benthos; and Finfish resource surveys in Norton Sound and Kotzebue Sound.

PB80-130040 PC **A17/MF A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Volume V. Receptors -- Fish, Littoral, Benthos.
Annual rept.
Oct 78, 377p NOAA-79101606
See also PB-279 068. Prepared in cooperation with Bureau of Land Management, Washington, DC.

As part of the Outer Continental Shelf Environmental Assessment Program this volume contains the following annual reports for the year ending March 1978: Reconnaissance characterization of littoral biota, Beaufort and Chukchi Seas; Beaufort Sea plankton studies; Ichthyoplankton of the eastern Bering Sea; Lower Cook Inlet meroplankton; and Seasonal composition and food web relationships of marine organisms in the nearshore zone.

PB80-130057 PC **A22/MF A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Volume VI. Receptors -- Microbiology.
Annual rept.
Oct 78, 502p NOAA-79101607
See also PB-280 775. Prepared in cooperation with Bureau of Land Management, Washington, DC.

As part of the Outer Continental Shelf Environmental Assessment Program this volume contains the following annual reports for the year ending March 1978: Assessment of potential interactions of microorganisms and pollutants resulting from petroleum development on the outer continental shelf of Alaska; Study of microbial activity and crude oil-microbial interactions in the waters and sediments of Cook Inlet and the Beaufort Sea; Determine the frequency and pathology of marine fish diseases in the Bering Sea, Gulf of Alaska, and Beaufort Sea; and Bering Sea ice edge ecosystem study.

PB80-130065 PC **A99/MF A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Volume VII. Effects.
Annual rept.
Oct 78, 761p NOAA-79101608
See also PB-280 776. Prepared in cooperation with Bureau of Land Management, Washington, DC.

As part of the Outer Continental Shelf Environmental Assessment Program this volume contains the following annual reports for the year ending March 1978: Effects of oiling on temperature regulation in sea otters; Sublethal effects of petroleum hydrocarbons and trace metals, including biotransformations, as reflected by morphological, chemical, physiological, pathological, and behavioral indices; Numerical ecosystem for the eastern Bering Sea; Effects of petroleum exposure on the breeding ecology of the Gulf of Alaska herring gull group and reproductive ecology of large gulls in the northeast Gulf of Alaska; and Influence of petroleum on egg formation and embryonic development in seabirds.

PB80-130073 PC **A99/MF A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Volume VIII. Contaminant Baselines.
Annual rept.
Oct 78, 628p NOAA-79101609
See also PB-279 069. Prepared in cooperation with Bureau of Land Management, Washington, DC.

As part of the Outer Continental Shelf Environmental Assessment Program this volume contains the following annual reports for the year ending March 1978: Quality assurance program for trace hydrocarbon analysis; Transport mechanisms and hydrocarbon adsorption properties of suspended matter in lower Cook Inlet; Identification of natural and anthropogenic petroleum sources in the Alaskan shelf areas utilizing low molecular weight hydrocarbons; Natural distribution and environmental background of trace heavy metals in Alaskan shelf and estuarine areas; Hydrocarbons: natural distribution and dynamics on the Alaskan outer continental shelf; and Characterization of organic matter in sediments from lower Cook Inlet.

PB80-130099 PC **A99/MF A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Volume X. Transport.
Annual rept.,
Oct 78, 933p NOAA-79101611
See also PB-279 070. Prepared in cooperation with Bureau of Land Management, Washington, DC.

As part of the Outer Continental Shelf Environmental Assessment Program this volume contains the following annual reports for the year ending March 1978: Morphology of Beaufort, Chukchi and Bering Seas near shore ice conditions by means of satellite and aerial remote sensing; Development of hardware and procedures for in-situ measurement of creep in sea ice; Circulation and water masses in the Gulf of Alaska; Near-shore meteorology; Modeling of tides and circulations of the Bering Sea; Coastal meteorology; Sediment characteristics, stability and origin of the barrier island-lagoon complex, North Arctic Alaska; and The environmental geology and geomorphology of the barrier island-lagoon system.

PB80-130107 PC **A99/MF A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Volume XI. Hazards.
Annual rept.
Oct 78, 693p NOAA-79101612
See also PB-279 071. Prepared in cooperation with Bureau of Land Management, Washington, DC.

As part of the Outer Continental Shelf Environmental Assessment Program this volume contains the

following annual reports for the year ending March 1978: Oil spill vulnerability of the Beaufort Sea coast; The interaction of oil with sea ice in the Arctic Ocean; Dynamics of near-shore ice; and Geochemistry of subsea perma-frost at Prudhoe Bay, Alaska.

PB80-130115 PC **A99**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Volume XII. Hazards.
Annual rept.
Oct 78, 626p NOAA-79101613
See also PB-279 109. Prepared in cooperation with Bureau of Land Management, Washington, DC.

As part of the Outer Continental Shelf Environmental Assessment Program this volume contains the following annual reports for the year ending March 1978: Benthos - sedimentary substrate interactions; Shallow faulting, bottom instability, and movement of sediments in lower Cook Inlet and western Gulf of Alaska; Faulting, sediment instability, erosion, and deposition hazards of the Norton Basin seafloor; Coastal processes and morphology of the Bering Sea coast of Alaska; Shoreline history of Chukchi and Beaufort Seas as an aid to predicting offshore permafrost conditions; and Seismotectonic studies of northeast and western Alaska.

PB80-131410 PC **A03**/MF **A01**
Texas Innovation Group, College Station.
A Training Manual for Setting Street Maintenance Priorities.
Technical transfer rept.,
Stephen Biles, and Richard Kerbel. Aug 79, 39p
TIG/TTR-2, NSF/RA-790259
Grant NSF-ISP78-07604

The manual was written to help city staff learn a method of describing street surface conditions which indicate maintenance need. By following the step-by-step process in this manual, a survey team can gather all the necessary data for the ranking of street maintenance needs. This method is a tool that can be used to help a city's decision makers allocate funds. It consists of four sections: preparing to survey; doing the survey; analyzing the survey results; and developing possible applications and recommendations. Terms used in training are described as well as the steps to take before surveying the city's streets. The surface conditions to be observed are outlined and their meaning and usefulness are described. Photographs are used to illustrate each condition. A system to analyze the survey's results by assigning points is set forth. These points show the relative severity of distress conditions observed on street surfaces. Applications of the survey results are discussed.

PB80-132632 PC **A07**/MF **A01**
Kansas Univ., Lawrence. Dept. of Civil Engineering.
Changes in Channel Geometry and Channel Capacity of Alluvial Streams Below Large Impoundment Structures.
Master's thesis,
Tai Huang. 1979, 146p W80-02611, OWRT-A-075-KAN(2)

Alluvial streams are known to form their own channels, and the characteristics of the channels is in a state of equilibrium with the bank material, and water and sediment discharge patterns. Construction of large impoundment structures on alluvial streams alters their water and sediment discharge patterns. Changes in channel geometry and channel capacity are therefore induced. In this study, the changes in channel geometry and channel capacity caused by large impoundment structures are examined. The theories of fluvial morphology and the theories of open channel flow are used for analyses. Hydraulically, the morphological changes of the stream channel are attributed to channel degradation and increased channel roughness. A channel degradation model is presented and applied on the Wakarusa River below Clinton Dam.

PB80-132665 PC **A08**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Natural Resource Economics Div.
Institutional Bases for Control of Nonpoint Source Pollution Under the Clean Water Act—With Emphasis on Agricultural Nonpoint Sources.
Final rept.,
Beatrice H. Holmes. Nov 79, 172p
Sponsored in part by Environmental Protection Agency, Washington, DC. Water Planning Div.

This publication explains (in an historical framework) how Section 208 and other planning provisions of the Clean Water Act and EPA's Water Quality Management program assist States, regional agencies and local governments to control nonpoint source pollution. It also explains the role of USDA's Rural Clean Water Program and other USDA conservation, research and extension programs in assisting conservation districts, farmers and other rural people to control nonpoint source pollution. A general analysis is made of State and local government regulatory powers and the powers of conservation districts to both regulate nonpoint source discharges and encourage their control without regulation. Examples of district regulations are discussed as are State nonpoint source control laws that exempt agricultural sources.

PB80-132673 PC **A09**/MF **A01**
Culp/Wesner/Culp, El Dorado Hills, CA.
Management of Small-to-Medium Sized Municipal Wastewater Treatment Plants.
Technical rept.
Jul 79, 194p EPA/430/9-79-013
Contract EPA-68-01-4917

This manual is for the managers of small to medium-sized municipal wastewater treatment plants. Although much of the information would be useful to any plant manager, it is primarily aimed at those individuals managing plants in the range of 3 to 10 mgd.

PB80-133036 CP **T06**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Industrial Source Complex (ISC) Dispersion Model.
Software,
George Schewe, and Erik Sieurin. Jan 80, mag tape EPA/DF-80/003
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-133044, and PB80-133051.

The model updates various EPA dispersion model algorithms and combines them in two computer programs that can be used to assess the air quality impact of emissions from the wide variety of source types associated with an industrial source complex. The ISC Model short-term program ISCST, an updated version of the EPA Single Source (CRSTER) Model uses sequential hourly meteorological data to calculate values of average concentration or total dry deposition for time periods of 1, 2, 3, 4, 6, 8, 12 and 24 hours. Additionally, ISCST may be used to calculate 'N' is 366 days. The ISC Model long-term computer program ISCLT, a sector-averaged model that updates and combines basic features of the EPA Air Quality Display Model (AQDM) and the EPA Climatological Dispersion Model (CDM), uses STAR Summaries to calculate seasonal and/or annual average concentration or total deposition values. Both the ISCST and ISCLT programs make the same basic dispersion-model assumptions. Additionally, both the ISCST and ISCLT programs use either a polar or a Cartesian receptor grid...Software Description: The programs are written in the FORTRAN IV programming language for implementation on a UNIVAC 1110 computer and also on medium-to-large IBM or CDC systems. 65,000k words of core storage are required to operate the model.

PB80-133044 PC **A16**/MF **A01**
Cramer (H. E.) Co., Inc., Salt Lake City, UT.
Industrial Source Complex (ISC) Dispersion Model User's Guide. Volume I.
Final rept.,
J. F. Bowers, J. R. Bjorklund, and C. S. Cheney. Dec 79, 367p EPA/DF-80/003A, EPA-450/4-79-030
Contract EPA-68-02-3323
For system on magnetic tape, see PB80-133036. See also PB80-133051.

Volume I describes the Industrial Source Complex Dispersion Model and its use. The model updates various EPA dispersion model algorithms and combines them in two computer programs that can be used to assess the air quality impact of emissions from the wide variety of source types associated with an industrial source complex. The ISC Model short-term program ISCST, an updated version of the CRSTER, uses sequential hourly meteorological data to calculate values of average concentration or total dry deposition for time periods of 1, 2, 3, 4, 6, 8, 12 and 24 hours. Additionally, ISCST may be used to calculate 'N' is 366 days. The ISC Model long-term computer program ISCLT, a sector-averaged model that updates and combines basic features of the Air Quality Display Model AQDM and the Climatological Dispersion Model CDM, uses STAR summaries to calculate seasonal and/or annual average concentration or total deposition values. The ISC Model programs are written in Fortran IV for the Univac 1110 computer. The two programs may also be used on medium-to-large IBM or CDC computer systems with little or no modification.

PB80-133051 PC **A20**/MF **A01**
Cramer (H. E.) Co., Inc., Salt Lake City, UT.
Industrial Source Complex (ISC) Dispersion Model User's Guide. Volume II: Appendices A through I.
Final rept.,
J. F. Bowers, J. R. Bjorklund, and C. S. Cheney. Dec 79, 470p EPA/DF-80/003B, EPA-450/4-79-031
Contract EPA-68-02-3323
For system on magnetic tape, see PB80-133036. See also PB80-133044.

Volume II contains the computer source code for the short term and long term Industrial Source Complex Dispersion models. The source code for the Meteorological Preprocessor program is also included. Example input and output test results for each model and preprocessor are listed. Input coding forms for each model are included.

PB80-133085 PC **A08**/MF **A01**
Texas Univ. at Austin.
Drilled Shaft Manual. Volume I. Construction Procedures and Design for Axial Loading.
Final rept. Jun 76-Jul 77,
Lymon C. Reese, and Stephen J. Wright. Jul 77, 151p FHWA/RD/IMP-77-21-VOL-1
Contract DOT-FH-11-9105
See also Volume 2, PB80-133093.

Drilled shafts have been used on a limited scale for many years as an alternative to driven piles in a variety of foundation problems. However, uncertainty about the behavior of the drilled shaft has forestalled widespread adoption. The subject package is intended for use by bridge engineers, geotechnical engineers, and builders of pile foundations. The manual contains rational procedures and practical guidelines for the design and construction of drilled shaft foundations. Volume I presents a rational design procedure for drilled shafts under axial loading and includes guidelines on construction methods, inspection, load testing, specifications, and cost estimates.

PB80-133093 PC **A11**/MF **A01**
Texas Univ. at Austin.
Drilled Shaft Manual. Volume II. Structural Analysis and Design for Lateral Loading.
Final rept. Jun 76-Jul 77,
Lymon C. Reese, and Junius D. Allen. Jul 77, 242p FHWA/RD/IMP-77-21-VOL-2
Contract DOT-FH-11-9105
See also Volume 1, PB80-133085. Errata sheet inserted.

Drilled shafts have been used on a limited scale for many years as an alternative to driven piles in a variety of foundation problems. However, uncer-

tainty about the behavior of the drilled shaft has forestalled widespread adoption. The subject package is intended for use by bridge engineers, geotechnical engineers, and builders of pile foundations. Volume II presents alternate methods for computing the response of the shaft to lateral loading and presents the structural design of the shaft for axial and/or lateral loading.

PB80-133135 PC **A99**/MF **A01**
Kansas Univ., Lawrence. Dept. of Chemical and Petroleum Engineering.
A Field Study of the Physical Effects of Thermal Discharges at La Cygne Lake, Kansas and Appendices.
Master's thesis,
Jan Wagner. 1979, 723p W80-02703, OWRT-B-032-KAN(3)
Consists of 2 volumes, basic and appendices.

Field studies were conducted at La Cygne Lake (871 ha) in eastern Kansas in order to determine the physical effects of thermal discharges from an 840 Mw power generating station. The results cover three and one-half years of study, including periods before and after plant startup. Temperature measurements defined the seasonal variation in lake temperatures, which were dominated by local climatological conditions. Discharge of thermal effluents resulted in both vertical and horizontal temperature gradients. Detailed descriptions of the temperature distributions under several combinations of meteorological and plant operating conditions showed a different temperature distribution for each set of conditions. There was no 'typical' temperature distribution. In all cases lake temperatures were three dimensional and closely related to current velocities. One-dimensional models formulated on an oversimplification of lake hydrodynamics were found to be inadequate for shallow lakes, such as La Cygne Lake.

PB80-133168 PC **A99**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Proceedings: Symposium on Flue Gas Desulfurization Held at Las Vegas, Nevada, March 1979; Volume I,
Franklin A. Ayer. Jul 79, 638p EPA-600/7-79-167A
Contract EPA-68-02-2612
See also Volume 2, PB80-133176.

The publication, in two volumes, contains the text of all papers presented at EPA's fifth flue gas desulfurization (FGD) symposium, March 5-8, 1979, at Las Vegas, Nevada. A partial listing of titles includes the following: Overview of control technology--the bridge between energy utilization and environmental goals; Health effects of SO2 and sulfates; Energy, environmental, and economic impacts of flue gas desulfurization under alternative new source performance standards; Status of development, energy and economic aspects of alternative technologies; Economics and energy requirements of sulfur oxides control processes; Combined coal cleaning and FGD; The interagency flue gas desulfurization evaluation study; Status of flue gas desulfurization in the United States; Recent results from EPA's lime/limestone scrubbing programs; TVA compliance programs for SO2 emission; SO2 and NOx removal technology in Japan; EPRI's FGD program--from problem identification to development of solutions.

PB80-133176 PC **A99**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Proceedings: Symposium on Flue Gas Desulfurization Held at Las Vegas, Nevada, March 1979; Volume II,
Franklin A. Ayer. Jul 79, 631p EPA-600/7-79-167B
Contract EPA-68-02-2612
See also Volume 1, PB80-133168.

The publication, in two volumes, contains the text of all papers presented at EPA's fifth flue gas desulfurization (FGD) symposium, March 5-8, 1979, at Las Vegas, Nevada. A partial listing of papers in Volume 2 includes the following: Basin Electric's involvement with dry flue gas desulfurization; Utility conventional combustion comparative environmental assessment--coal and oil; Design and commercial operation of lime/limestone FGD sludge stabilization systems; Power plant flue gas desulfurization using alkaline fly ash from western coals; Environmental effects of FGD disposal--a laboratory/field landfill demonstration; Summary of utility dual alkali systems; The FGD reagent dilemma--lime, limestone, or thiosorbic lime; The status of industrial boiler FGD applications in the United States; Status of the project to develop standards of performance for industrial fossil-fuel-fired boilers; Flue gas desulfurization applications to industrial boilers.

PB80-134950 PC **A09**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
Long-Range Transport and Transformation of SO2 and Sulfate.
Final rept. May 77-Apr 79,
Teizi Henmi, and Elmar R. Reiter. Nov 79, 185p EPA-600/4-79-068
Grant EPA-R-805271

Technical descriptions and computer programs are presented for two models that calculate long-range transport, diffusion, transformation of SO2 to sulfate, and dry and precipitation deposition of initially emitted SO2. One model treats the mixing layer height as constant; the other (at the expense of computer time) varies the mixing layer height diurnally and tracks pollutants in three layers--the daytime mixing layer, the nocturnal ground-based stable layer, and the daytime mixed layer that remains above the nocturnal stable layer. Application of the multi-layer model over a region encompassing the Ohio River Basin produced patterns of SO2 and sulfate concentrations that are statistically correlated with observed concentrations. An empirical formula for the transformation rate of SO2 to sulfate is derived. Using a cumulus cloud model, results showed that sulfate aerosol capture by cloud water through microphysical processes is sufficient to produce observed levels of sulfate in rain water.

PB80-135213 PC **A09**/MF **A01**
National Oceanic and Atmospheric Administration, Rockville, MD.
Reports of the Subcommittees on: National Needs and Problems, Data Collection, Storage, and Distribution, Monitoring, Research and Development.
Working papers 2-5.
Aug 79, 184p NOAA-80011001
See also Paper 6, PB-297 467. Prepared in cooperation with Federal Coordinating Council for Science, Engineering and Technology, Washington, DC.

The subcommittee reports are presented in this document as Working Papers 2-5 for the Federal Plan for Ocean Pollution Research, Development and Monitoring, Fiscal Years 1979-83. The titles are as follows: First report of the subcommittee on national needs and problems; Report of the subcommittee on data collection, storage, and distribution; Report of the subcommittee on monitoring; Report of the subcommittee on research and development.

PB80-135221 PC **A09**/MF **A01**
Hydroscience, Inc., Knoxville, TN.
NPDES Best Management Practices Guidance Document.
Final rept. Jan 78-Oct 79,
J. G. Cleary, O D. Ivins, G. J. Kehrberger, C. P. Ryan, and C. W. Stuewe. Dec 79, 179p EPA-600/9-79-045
Contract EPA-68-03-2568

This document has been developed based on a review of current practices used by industry to prevent release of toxic and hazardous substances to receiving waters from non-point sources. Including in the review were published articles and reports, technical bulletins on specific compounds, and discussions with industry through telephone contacts, routine questionaires, and site visits. The information available on current Best Management Practices was evaluated and grouped into general categories of baseline and advanced concepts. BMPs were related to pollutant sources and physical and chemical properties of the compounds. A classification scheme was developed for the toxicant hazardous substances, based on important physical and chemical properties revelent to identification of applicable BMP alternatives. The method of identifying BMPs based on chemical and source is presented.

PB80-135726 PC **A04**/MF **A01**
Department of Housing and Urban Development, San Francisco, CA. Office of Program Planning and Evaluation.
Tribal Housing Rehabilitation Programs. A Guide.
Peter Richardson, and John Trauth. Jan 78, 52p
Rept no. HUD-0000480

This guide has been designed to assist tribal officials who are contemplating or who have received Community Development Block Grants for housing rehabilitation programs. These programs face special problems -- large numbers of substandard units in distant locations, lack of skilled craftsmen on the reservation, and problems of materials delivery and work scheduling. This Guide is based on information gathered from ongoing efforts on reervations in California, Nevada, Arizona, and New Mexico. The first step is an assessment of the problem, which can be obtained through a 'windshield survey' conducted by tribal officials driving around the reservation. Once the tribe knows how many dwellings are involved and the condition of these dwellings, a fair allocation can be made. Guidelines for setting these allocations are given. Often a tribe must go to an outside contractor to get an effective supervisor. The key to a good program is construction know - how and the ability to schedule time and materials delivery. Local building codes should be used to set standards. Some tribes use their housing rehabilitation programs to teach unemployed tribal members construction skills. Others have found it too expensive to slow down an entire project while unskilled workers learn. Techniques for using paid skilled labor to teach unskilled workers are given. The final sections cover materials scheduling and the pros and cons of relocating families while the work is being done. Appendices contain sample report forms, checklists, and other project management materials.

PB80-135767 PC **A12**/MF **A01**
Center for Systems and Program Development, Inc., Washington, DC.
Evaluation of the Black Colleges Local Capacity Building Models Program.
Final rept.,
Roosevelt Johnson, and Michael F. Taylor. 31 Oct 77, 264p HUD-0000491
Contract HUD-H-2481

Commissioned by HUD, this report describes the findings and conclusions of an evaluation of Positive Futures, Inc. (PFI), a consortium of nine black colleges and universities which established Local Capacity Building (LCB) programs designed to (1) utilize the resources and capabilities of the member institutions in supporting local government management needs, (2) build, aid, or improve the management capabilities of local communities, and (3) foster increased community involvement and participation in local affairs by providing the resources, training, and ongoing support necessary to improve the skills and expertise of the community. The major objectives of the study were (1) to define LCB at the participating PFI institutions, (2) to determine the methods, techniques, and approaches used by the institutions in pursuing LCB programs, (3) to determine how effective the institutions' programs were in increasing the management capability of local communities, (4) to assess the potential for transferability of the LCB concept to other communities and institutions. Site visits were undertaken at six of the PFI institutions, followed by analyses of interview data, program records, and other documentation. Among other things, it is concluded that the black college LCB program was successful in meeting its primary goal of increasing management capabilities within the local communities of four of the six institutions. The program was also found to be unusually cost effective and four institutions were effective in fostering meaningful relationships with the local governments. Further, the LCB program was found to strengthen the institutions' education effort and to contribute to the enchancement of their involvement in community life.

PB80-135858 PC **A07**/MF **A01**
Stevens Inst. of Tech., Hoboken, NJ. Center for Municipal Studies and Services.

Waterfront Redevelopment Project Report No. 2: Available Options.
Final rept.,
Helen Manogue, and Arthur Lesser. Mar 77, 147p HUD-0000507
Contract HUD-H-2196R

The second in a series on redevelopment of the Hoboken, N.J., waterfront, this report examines available options for short and long - term redevelopment of the waterfront. The advantages and disadvantages of various alternative schemes are considered, and ideas that were researched and rejected, together with the reasons for their elimination, are also included. Existing conditions (1977) of property and employment on the waterfront are described, and recent events that have been held in the waterfront area are discussed as examples of how the waterfront currently can be used without radical change. It is noted that waterfront tourism cannot be cultivated only by single, unique events which have characterized waterfront usage in recent years. There must be regularly scheduled tourist attractions publicized in advance. One attractive tourism plan incorporates various recreational and historical sites into a package presentation. Advantages and disadvantages of alternative uses of the waterfront are discussed including the following: industrial land use, foreign trade zone, oil and gas off - shore exploration facilities, shipping, industrial firms now on the waterfront, commercial land use, commercial buildings, medical complex, convention center, movie studios, residential land use, recreational land use, rooftops and vacant areas, park settings, marina, and private clubs. Ideas for implementing and controlling various development plans are discussed. All government levels should be involved in redevelopment plans. State and Federal influences on implementation, governmental mechanisms for execution, the involvement of county governments, councils of government, new regional governments, and specific mechanisms for implementation are considered. Ingredients of an urban waterfront planning and control system also are examined. Tabular and graphic data obtained in the study are included; the appendices contain an urban waterfront policy for N.J. and an attitude assessment survey.

PB80-135866 PC **A06**/MF **A01**
Stevens Inst. of Tech., Hoboken, NJ. Center for Municipal Studies and Services.
Regional Supply and Demand of Small Boats and Associated Services.
Final rept.,
Coleen Camp. Dec 77, 106p HUD-0000508
Contract HUD-H-2196R

This thesis reports on one of the tasks of a project undertaken by the Center for Municipal Studies and Services at Stevens Institute as part of the Hoboken Waterfront Redevelopment Project. Previous project reports have indicated the need to find and explore alternative uses for the urban waterfront; this study explores converting urban waterfront areas into small boat manufacturing, repair, and service facilities. The study determines supply and demand of boats and boating services, with emphasis on local supply and demand of recreational boats. Hoboken is the core user area, with northern New Jersey, Manhattan, Staten Island, New York State bordering New Jersey, and eastern Pennsylvania forming the intermediate and outer rings of population user areas. The study gathered data on boat owners, marinas, boat manufacturers, and suppliers and consultants for the local, regional, and national levels. Sources of data are identified. Study findings show that the lack of mooring, launching, and service facilities is inhibiting further growth of the small, recreational boat industry. There are approximately 226,000 registered boat owners residing within 50 miles of Hoboken, and there are nearly 40,000 registered boats whose owners reside in Bergen, Essex, Hudson, and Union Counties. It is estimated that one - fourth of these owners keep their boats in their county of residence. Marina / boat yard factors important to boaters include the availability of gas, oil, minor repairs, and winter storage. Security and ability to perform major repairs are highly ranked. Due to high taxes and large initial investment, it is not expected that Hoboken marina operations could support all the expenses of a Hudson River site; however, because such a facility is in high demand, it should be considered a part of every major commerical, retail, and residential urban waterfront redevelopment. Tabular data are provided, along with a bibliography, and the appendices include samples of the instruments used in the study.

PB80-135957 PC **A02**/MF **A01**
American Inst. of Planners, Washington, DC.
Planning and Management '701'. The City of Simi Valley, California Net/Benefit Assessment Process. An Evaluation System Primarily for Small and Medium Size Cities.
Joseph Panaro, Judith C. Pabst, and Richard Jaffeson. 1977, 18p HUD-0000523

The 'Net / Benefit' Assessment Process, a method of organizing information for decisionmaking on physical, social, economic, fiscal, and environmental impacts of land use projects and alternative plans, is described for elected and appointed officials, planners, and managers. The Net / Benefit process was developed in a joint effort by the City of Simi Valley, Calif., and John Blayney Associates, San Francisco, Calif., and involved checking existing review procedures to avoid duplication, testing by simulation on development proposals, and modifying the process to ensure the accuracy of its overall predictions. A basic component of the process as developed in Simi Valley is the impact matrix concept which permits assessment of the impact of a project (e.g., major annexation or zoning proposals, development proposals, alternative site plans) by analyzing the interaction between the city's concerns and priorities and project features. Elements of the matrix are evaluation criteria -- public services and fiscal element, economic element, social element, environmental element -- and project features -- physical design, density / intensity, land use relationship, development schedule, fiscal arrangements. Impacts are classified as benefits or disbenefits. The matrix also expands to include mitigating measures (actions that the city, county, or developer could undertake to lessen negative impacts resulting from a project) and tradeoffs. The entire Net / Benefit process can be distilled into three basic operations: determining impacts, developing mitigation measures, and trading off and decisionmaking. Steps for developing the system and actually using it are presented, and notes on transferability and limitations of the process are provided. Appendices include a bibliography, evaluation matrices by element and criteria for test commercial examples, distributional impacts by project feature, and a net / benefit analysis summary balance sheet.

PB80-135999 PC **A06**/MF **A01**
Iowa Univ., Iowa City. Inst. of Urban and Regional Research.
Impact Evaluation: Principles, Procedures, and Guidelines. North Side Neighborhood Preservation Study.
Rept. no. 1,
Douglass Lee. Jun 78, 117p HUD-0000528
Grant HUD-B-76-SI-19-001

An older mixed - use neighborhood on the north side of the City of Iowa City, Iowa (locally called 'The North Side') was selected for a HUD innovative neighborhood preservation project demonstration. This, the first of a series of 16 reports, explains the rationale behind the North Side preservation effort. The project emphasized controlling negative external impacts while encouraging residents to take positive preservation steps. There was minimum public intervention to allow residents maximum flexibility in resolving land - use conflicts. The study developed a list of negative impacts including airborne pollutants, water - borne pollutants (runoff, standing water, silt and debris, toxic pollutants, and pathogens), vibrations, physical dangers and fire hazards, heat, animal pests, light and air infringement, unsightliness, privacy and lifestyle conflicts, uses which cause mental anguish, and uses that offend morals. Each new structure was evaluated in terms of these negative impacts and an appeal procedure was developed to limit such uses. (This process started with zoning board appeals and continued through court action.) This process was chosen rather than strict zoning codes because the pressures for change is likely to take place. Because it is more flexible, impact evaluation allows for an evolution of land uses while, at the same time, preserving neighborhood amenities and limiting negative influences. Tables illustrate both the components of each identified impact and the decision process. References and appendices are provided.

PB80-136005 PC **A05**/MF **A01**
Iowa Univ., Iowa City. Inst. of Urban and Regional Research.
Land Use Regulation and Administration. North Side Neighborhood Preservation Study.
Rept. no. 2,
Gerald Thompson. May 78, 82p HUD-0000529
Grant HUD-B-76-SI-19-0001

The Iowa City, Iowa, land - use regulations and administrative procedures have posed major problems for those attempting to preserve the city's historic North Side. The regulations are so complex and scattered throughout the city code that enforcement is difficult. Also, they do not call for a comprehensive review of possible negative effects, there is little citizen input into the decisionmaking process, and there is no incentive for developers to consider broad neighborhood concerns. As a result, historic and architecturally interesting single - family homes are being torn down and replaced by three - and four - story apartment buildings surrounded by open parking. Each step of the land - use decision process is traced and the limited routes of appeal available to objecting homeowners or preservationists are reviewed. The study recommends rewriting and consolidating the land - use regulations to make them easier to understand and easier to enforce. Citizen hearings should be called whenever major neighborhood changes are considered. Greater use should be made of permits and a complete evaluation of negative effects should be made before a permit is issued. The rewritten regulations should contain procedures for considering residential performance standards and site - plan reviews. Incentives also should be given to developers who aid preservation efforts, including financial incentives, flexible zoning requirements, and preferential permit treatment. Appendices contain the forms and a review of procedures used by Iowa City's land - use regulation system.

PB80-136013 PC **A03**/MF **A01**
Iowa Univ., Iowa City. Inst. of Urban and Regional Research.
Land Use Intensity. North Side Neighborhood Preservation Study.
Rept. no. 3,
Douglass Lee. May 78, 46p HUD-0000530
Grant HUD-B-76-SI-19-0001

As a first step in an innovative preservation project, the character of the North Side neighborhood of Iowa City, Iowa, was documented through onsite observations and land record data. City officials previously have been ambiguous in their attitudes toward the area and as a result, new apartment buildings entirely out of character with the older homes are scattered throughout the neighborhood in a way that suggests intentional dispersal. About half the land is used by highways, streets, and parking lots, most serving nonresidents. Restriction of transportation land uses is a high priority need. Average parcel size is about 6,000 square feet and parcel densities range from a low of 4 dwelling units to the acre for single - family homes on large lots to about 50 dwelling units to the acre for apartment units. Frequently these densities are found in the same block. A map shows that densities are higher near the University of Iowa, Mercy Hospital, and downtown. Nonresidential and commercial uses are sprinkled rather than clustered in the area. However, most of these businesses are small and neighborhood - oriented. Home ownership also is sprinkled throughout the area, with the highest concentration in the northeast section. In spite of the neighborhood's problems, high homeowner confidence exists and property turnover is steady. There is no evidence of speculation or panic selling. The area's strengths are its variety of architectural styles, its mix of ages and family structures, and small restaurants and stores within walking distance.

PB80-136021 PC **A04**/MF **A01**
Iowa Univ., Iowa City. Inst. of Urban and Regional Research.
Historic Structures Inventory. (Selected Portions). North Side Neighborhood Preservation Study.
Rept. no. 4,

Elaine Baxter. May 78, 68p HUD-0000531
Grant HUD-B-76-SI-19-0001

Undertaken as part of the Iowa City, Iowa, North Side Neighborhood Preservation Study, this inventory of historical and architecturally significant structures in the north side area reviews the various architectural styles identified in the neighborhood (i.e., Greek Revival, Italianate, Gothic, Queen Anne, Victorian, Georgian Revival) and catalogues, block - by - block, nearly 80 structures. As one component of a comprehensive planning study of the north side, the historic survey is intended to serve two major purposes: to document some of the many social and physical resources that make the community an important and worthwhile segment of Iowa City, and to integrate a concern for historic preservation with a general interest in neighborhood protection. In addition to sketches of the selected architectural styles identified in the north side neighborhood, fact sheets are provided on each structure, indicating its address, present use, present owner, date of construction, building type and material, architectural style, condition, importance to the neighborhood, notable features of the building and site, original owner, original use, and historical signficance. The north side area dates from the 1830's, when immigrants from Ireland, Germany, Scotland, and elsewhere settled in Iowa, and it is recommended that some kind of additional incentive to retain the identified structures be created, possibly in the form of an historical district or districts. Iowa has enacted legislation which describes the process by which such districts may be established. References are included.

PB80-136039 PC **A04**/MF **A01**
Iowa Univ., Iowa City. Inst. of Urban and Regional Research.
Streets and Traffic. North Side Neighborhood Preservation Study.
Rept. no. 5,
Kevin Laverty, Mary Howard, and Douglass Lee. May 78, 54p HUD-0000532
Grant HUD-B-76-SI-19-0001

The transportation element of the North Side preservation study, conducted for Iowa City, Iowa, devised a number of ways to minimize the negative impact of traffic while maintaining needed circulation patterns. The area is near downtown, the University of Iowa, and Mercy Hospital. As a result, nonresidential automobile traffic is heavy and often is a danger to residential movement which is mostly on foot or by bicycle. Many motorists use alleys as short cuts. The study recommends well - marked pedestrian crosswalks at all arterial intersections, well - marked bicycle lanes, and signs warning motorists of both pedestrian and bicycle uses. Three exceptionally busy intersections need traffic signals. Diverters or barriers should be erected to eliminate through traffic on residential streets and to discourage the use of alleys as streets. A concrete 'neck' formed by extending the curb into the crosswalk can be used to slow down traffic turning into a residential street from an arterial street; these necks would also give greater protection to pedestrians. Brick paving should be retained or restored on residential streets because it adds to the character of the neighborhood and tends to slow down traffic. Finally, sightlines at intersections should be kept as they are or reduced since motorists tend to drive more carefully with restricted sightlines. Maps, drawings, and an extensive bibliography are included.

PB80-136047 PC **A03**/MF **A01**
Iowa Univ., Iowa City. Inst. of Urban and Regional Research.
Parking. North Side Neighborhood Preservation Study.
Rept. no. 6,
Victoria Williams. May 78, 47p HUD-0000533
Grant HUD-B-76-SI-19-0001

Part of the Iowa City, Iowa, North Side Neighborhood Preservation Study, this report focuses on parking problems in the north side area and suggests and evaluates possible remedies. Because the north side is located near the downtown area and the University of Iowa, there is a large demand for parking space in the neighborhood. Multifamily structures often contain several car owners per dwelling, and this coupled with the demands of other competing parkers has led to overcrowding of the available parking and other negative effects. The study found several factors to be primarily responsible for the excess of parking demand: (1) commuter parking due to the neighborhood's convenient location in relation to downtown, Mercy Hospital, the university, and bus lines; (2) storage of cars belonging to students living in nearby university dormitories; and (3) inadequate off - street parking space for area apartment units, rooming houses, fraternities, and single family residences. The most innovative of several possible remedies are: (1) a parking permit system -- attaching a price to curbside parking or allowing preferential parking for residents and charging a small fee would serve a dual purpose of channeling some parkers back into municipal and university - provided facilities and forcing those who continue to park on the street to assume the costs of its undesirable side effects; (2) a usable open space requirement -- specified amounts of usable space, incorporated into site requirements, would work together with parking and building area specifications to indirectly control the number of dwelling units that could feasibly share a lot; and (3) the reduction of parking demand at Mercy Hospital -- because parking is a free benefit at the hospital, removal of this incentive would encourage employees to carpool or seek alternative transportation. Maps, tables, and references are included.

PB80-136054 PC **A06**/MF **A01**
Iowa Univ., Iowa City. Inst. of Urban and Regional Research.
Community Facilities. North Side Neighborhood Preservation Study.
Rept. no. 7,
Margaret Barron. May 78, 121p HUD-0000534
Grant HUD-B-76-SI-19-0001

As part of a neighborhood preservation project on the north side of Iowa City, Iowa, a comprehensive range of community services is evaluated in this report, without regard to whether they are publicly provided, offered by private enterprise, or provided by a combination of public and private resources. Facilities reviewed include schools, parks, libraries, hospitals, clinics, groceries, restaurants, and other public and private facilities providing police and fire protections, housing and code enforcement, transportation services, and public work (i.e., water, sewer, gas, electricity, and telephone services). Overall, the north side of Iowa City was found to be moderately well served, although a few deficiencies and some related problems were uncovered including the following: (1) Horace Mann Elementary School is experiencing declining enrollment; (2) no library facilities for the general public are located in the area; (3) Happy Hollow Park and Mercy Hospital, as well as some retail establishments, provide valuable services, but also create some negative effects because of their orientation to a service area larger than the immediate neighborhood; and (4) most negative effects result from traffic and parking, although litter, petty vandalism, noise, and unsightliness are associated with some community facilities. It is recommended that Horace Mann School be retained and converted to joint uses, perhaps a small library oriented to the area's elderly population. Further, Happy Hollow Park either should be expanded or the recreation programs and facilities should be altered to better serve nearby residents. Also, a policy should be adopted to favor public and private services in the neighborhood that make efforts to appeal to neighborhood residents and pedestrian access. Finally, no distinction should be made between public and private services in requiring that acceptable standards of 'neighborliness' be met. An inventory of selected commercial facilities is appenesd. Maps of the north side are provided.

PB80-136062 PC **A03**/MF **A01**
Iowa Univ., Iowa City. Inst. of Urban and Regional Research.
Neighborhood Site Improvements. North Side Neighborhood Preservation Study.
Rept. no. 8,
Victoria Williams. May 78, 28p HUD-0000535
Grant HUD-B-76-SI-19-0001

The idea behind the Neighborhood Site Improvements report of the Iowa City, Iowa, North Side Neighborhood Preservation Study was to produce a miniature capital improvements program at the neighborhood level, solely for the purpose of discussion. The result was a list of possible neighborhood improvements that evolved from residents' comments at block meetings, expressions of concern from members of the North Side Neighbors organization, and observations of the study staff. Possible trafficway improvements include alley surfaces, traffic control in alleys, cement patches in brick streets, pedestrian right - of - ways, traffic diverters, 'necking,' traffic lights, and bike lanes. Areas for improvement were also identified with regard to screening parking lots, planting trees and other vegetation, diverting utility lines underground, expanding a neighborhood park, and providing pedestrian walkways, lighting, and benches. No priorities are assigned to the improvements and no attempt is made to evaluate them. Rather, they are presented as culled from other North Side Study reports, along with cost estimates, so residents and policymakers can judge for themselves which projects create high benefits relative to costs. A program of improvements is presented at the end of the report; included in the table are the location of the proposed improvement, the source of its recommendation, a description of the improvement itself, and an estimate of some of the cost parameters. Maps and other tabular and graphic representations are also provided.

PB80-136070 PC **A03**/MF **A01**
Iowa Univ., Iowa City. Inst. of Urban and Regional Research.
Impact Survey Manual. North Side Neighborhood Preservation Study.
Rept. no. 9,
Margaret Barron. May 78, 29p HUD-0000536
Grant HUD-B-76-SI-19-0001

Developed in the course of a land use study of the north side of Iowa City, Iowa, the Impacts Survey Manual was designed to facilitate the gathering and organization of specific, detailed information concerning the positive, negative, and regulatory aspects of land uses in a multiuse neighborhood. The complete survey constitutes a combination of data compiled from existing municipal sources plus a block - by - block walking survey of the study area. The information that is gathered falls into three categories: block data, resources, and negative impacts. In addition, a map of each block is drawn from existing city maps and used for recording information during the field - survey component. Instructions are cited for performing the survey. The first step is to prepare a map of each block, depicting the parcel boundaries and numbers. In addition, block data forms should be prepared and filled out on the basis of available information. Secondly, the maps and block data forms are taken into the field, where two surveyors walk around each block twice, including any alleys. On the initial walk - around, one surveyor verifies the information on the data forms and rates owner investments in major structures. The second surveyor completes the block map by drawing structures, parking areas, trees, and other significant features. The block resources are identified by a single surveyor the first time around, while both surveyors concentrate on the negative aspects of the area the second time around. Once the neighborhood survey is completed, block meetings are organized to gain neighborhood input and cooperation. The meetings aim to identify issues, analyze problems and processes, propose solutions and changes, and increase citizen awareness and understanding of the processes leading to neighborhood problems and the tradeoffs involved in proposed solutions. Directions for fulfilling both the survey and block meeting tasks are provided, along with a sample map and block data form.

PB80-136088 PC **A10**/MF **A01**
Iowa Univ., Iowa City. Inst. of Urban and Regional Research.
Impact Survey, 1978. North Side Neighborhood Preservation Study.
Rept. no. 10,
Andrew Chesley, Paul Panik, Susan Schmidt, and Rebecca Schroeder. May 78, 209p HUD-0000537
Grant HUD-B-76-SI-19-0001

Undertaken by the Iowa City Department of Community Development and the University of Iowa, this impact study constitutes a block - by - block survey of land use and its effects on the north side

of Iowa City, Iowa. Some of the traditional components of a land - use survey are included in the impacts study. Utilizing records available through the city assessor's office, the following information was compiled and arranged on maps of individual blocks: (1) parcel identification number and location; (2) parcel address; (3) existing land use; (4) parcel owner; and (5) whether a residence is owner - occupied. Additional components were added to provide information concerning the positive, negative, and regulatory effects of land - use activities in a multiuse, historically significant neighborhood. Data on these components are listed by block as either 'resources' or 'negative impacts.' The resources section contains a listing of those features which contribute positively to a block's overall quality, and include such items as mature trees, open space, corner grocery stores, and buildings of historic or architectural merit. The negative impacts of one land use activity upon another are listed on a per block, parcel - specific basis. In contrast to resources, negative impacts reduce the overall quality of the block and may include a large unpaved parking lot creating dust, noise, traffic hazards, and unsightliness for a block. For each block, both the source of these negative impacts and the properties affected are identified. Finally, zoning information is provided for each parcel and block, along with brief block - specific comments made by surveyors during or immediately following the completion of each block survey.

PB80-136096 PC **A04**/MF **A01**
Iowa Univ., Iowa City. Inst. of Urban and Regional Research.
Citizens' Self-Help Handbook. North Side Neighborhood Preservation Study.
Rept. no. 11,
Timothy Fluck. May 78, 68p HUD-0000538
Grant HUD-B-76-SI-19-0001

Focusing on the north side of Iowa City, Iowa, this manual outlines specific strategies for pursuing citizen complaints about neighborhood problems and provides information regarding interest groups and government agencies supplying citizen assistance in problem - specific areas. The strategies are arranged according to problem type and relate to building and land uses, streets and sidewalks, and people and animals. Each topic is divided into four sections: (1) background sections provide summaries of city ordinances that will provide a foundation to citizen complaints; (2) self - help sections recommend courses of action which individuals or groups of neighbors can take to get action on a problem; (3) interest group sections provide the names of organizations lending support to citizens; and (4) government agency sections provide the names of departments and commissions within city government responsible for acting on citizen complaints. Specific areas of concern include building and housing codes, fire inspections, public nuisances, construction permits, weeds and grass, stagnant water, mutilation or spraying of trees, burning leaves, junked cars, parking on private property, storage of refuse, litter, traffic obstructions, and, among other topics, ice and snow removal. Guides to city officials, the news media, and legal assistance are included. An index is included.

PB80-138217 PC **A05**/MF **A01**
Transportation Research Board, Washington, DC.
Pavement Systems: Assessment of Load Effects, Design, and Bases.
R. Frank Carmichael, III, Freddy L. Roberts, Harvey J. Treybig, C. Michael Walton, and James L. Brown. 1979, 95p TRB/TRR-725, ISBN-0-309-02975-9
Library of Congress catalog card no. 79-607910. Also pub. as ISSN-0361-1981.

The 12 papers in this report deal with the following areas: procedure for evaluating the effects of legal load limits on pavement costs; heavy trucks on Texas highways: an economic evaluation; fatigue damage to flexible pavements under heavy loads; factorial study of relations between pavement cost and legal axle loads; allowable load on multiple-axle trucks; evaluation of full-depth asphalt pavements; analysis of a cracked pavement base layer; design of pavements with lean-concrete bases; evaluation of structural coefficients of stabilized base-course materials; behavior and performance of aggregate-cement pavements; field performance of aggregate-lime-pozzolan base material; and structural design of pcc shoulders.

PB80-803844 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Urban Storm Sewer and Water Runoff. Volume 3. 1977-October, 1979 (Citations from the NTIS Data Base).
Rept. for 1977-Oct 79,
Robena J. Brown. Jan 80, 243p
Supersedes NTIS/PS-78/1217, NTIS/PS-77/0856, NTIS/PS-76/0743, NTIS/PS-75/602, and NTIS/PS-74/108. See also Volume 1, 1964-1973, NTIS/PS-75/603 and Volume 2, 1974-1976, NTIS/PS-78/1216.

The citations to research reports can be separated into three areas: Urban storm runoff problems and abatement; combined and storm sewers; and urban hydrology and its modeling. The reports include not only engineering specifics but also planning and impact studies. (This updated bibliography contains 236 abstracts, 67 of which are new entries to the previous edition.)

PB80-804479 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Automobile Air Pollution: Exhaust Analysis (Citations from the NTIS Data Base).
Rept. for 1970-Jan 80,
Diane M. Cavagnaro. Feb 80, 214p
Supersedes NTIS/PS-79/0087, NTIS/PS-78/0147 and NTIS/PS-77/0174.

Methods of analyzing the exhaust from automobiles are covered in these citations. The techniques include gas chromatography, mass spectroscopy, and infrared spectroscopy. Reports are presented on monitors, types of emissions, smoke measurement, and exhaust composition. The studies cover direct and remote sampling and analytical techniques. (This updated bibliography contains 207 abstracts, 9 of which are new entries to the previous edition.)

PB80-804685 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Automobile Air Pollution: Control Equipment. Volume 1. 1964-1978 (Citations from the NTIS Data Base).
Rept. for 1964-78,
Diane M. Cavagnaro. Feb 80, 266p
For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-79/0085 and PB80-804701.

Research reports on air pollution control equipment used in automobiles are cited. Topics include the design and performance of catalytic and thermal reactors, retrofit devices, carburetors, and ignition timing systems. Also covered are studies of the catalysts as well as the equipment regulations that the industry must follow. (This updated bibliography contains 259 abstracts, none of which are new entries to the previous edition.)

PB80-804693 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Automobile Air Pollution: Control Equipment. Volume 2. 1979-January, 1980 (Citations from the NTIS Data Base).
Rept. for 1979-Jan 80,
Diane M. Cavagnaro. Feb 80, 66p
Supersedes NTIS/PS-79/0084, NTIS/PS-78/0136, and NTIS/PS-77/0166. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-79/0085 and PB80-804701.

This bibliography of Federally-sponsored research cites control equipment and retrofit techniques to control automobile exhaust emissions. The topics include the design and performance of catalytic and thermal reactors, retrofit devices, carburetors, and ignition timing systems. Also covered are studies of the catalysts as well as the equipment regulations that the industry must follow. (This updated bibliography contains 59 abstracts, all of which are new entries to the previous edition.)

PB80-804701 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Automobile Air Pollution: Control Equipment--Catalytic Converters. Volume 2. 1977-January, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1977-Jan 80,
Diane M. Cavagnaro. Feb 80, 149p
Supersedes NTIS/PS-79/0086, NTIS/PS-78/0137, and NTIS/PS-77/0167. For the companion Published Search of the NTIS Data Base, see PB80-804685 and PB80-804693. See also Volume 1, 1970-1976, NTIS/PS-79/0085.

The citations of worldwide engineering literature cover automotive catalytic converters. Included are such topics as converter design and materials, performance tests, effectiveness in pollutant reduction, catalyst poisoning, catalyst selection, chemistry involved in the emission control, and the overall feasibility of using these converters under normal driving conditions. Control of sulfuric acid and sulfate emissions is also discussed. (This updated bibliography contains 142 abstracts, 37 of which are new entries to the previous edition.)

13C. Construction Equipment Materials, and Supplies

AD-A078 789/5 PC **A02**/MF **A01**
Forest Products Lab Madison WI
Structural Sandwich Performance After 31 Years of Service.
Forest Service research paper,
Jerome Palms, and Gerald E. Sherwood. 1979, 22p Rept no. FSRP-FPL-342

Study of the design and fabrication of structural sandwich panels was initiated at the Forest Products Laboratory in the mid 1940's. It was recognized that, even with extensive basic research, additional information would be needed on the long-term serviceability and durability of sandwich panels as a building component. Accordingly, an experimental unit was built on the laboratory grounds in 1947 to provide for long-term exposure tests of panels. Selected sandwich panels placed in the exposure unit were evaluated for bending strength and stiffness after various lengths of service between the years 1947-1978. Panels were constructed with a variety of facing materials including plywood, aluminum, particleboard, hardboard, paperboard, and cement asbestos, and with cores of paper honeycomb, polyurethane, and extruded polystyrene. Measurements were kept of the bowing of panels due to seasonal climatic changes. This information should be useful to building manufacturers, building code authorities, and others concerned with design and manufacture of housing. (Author)

AD-A078 856/2 PC **A04**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS
Effectiveness of Mineral Admixtures in Preventing Excessive Expansion of Concrete Due to Alkali-Aggregate Reaction.
Technical rept.,
Alan D. Buck, B. J. Houston, and Leonard Pepper. Jul 58, 58p Rept no. WES-TR-6-481

Twenty materials, representing eight different classes of mineral admixtures, were evaluated, using both chemical and mortar-bar test methods, for their effectiveness in preventing excessive expansion of concrete due to alkali-aggregate reaction. The criteria of the chemical tests are examined, and the test results were compared with the mortar-bar test results. All results were compared with those obtained by two other laboratories. It was found that the chemical tests cannot be used with reliance to evaluate effectiveness, and that the mortar-bar test procedure needs improvement to increase its precision. Each of the replacement materials evaluated will prevent excessive expansion if a sufficient quantity is used. Correlations were found between effectiveness and: fineness, dissolved silica, and percentage of alkali retained by reaction product. Calculations were made that suggest that the minimum quantity of each material required for effective prevention of excessive expansion ranged from 10% for the synthetic silica glass to 45% for one of the slags. By groups these calculated minimum percentages were: calcined shales, 19 to 29; uncalcined diatomite, 22; volcanic glasses, 32 to 36; slags, 39 to 45; fly ashes, 40 to 44.

AD-A078 857/0 PC A03/MF A01
Army Engineer Waterways Experiment Station Vicksburg MS
Requirements for Water for use in Mixing or Curing Concrete.
Technical rept.,
Bryant Mather, and R. V. Tye. Nov 56, 40p Rept no. WES-TR-6-440

Literature on the quality of water for mixing and curing concrete indicates that relatively few investigations on this subject have been conducted. It seems to have been generally agreed that water fit to drink was fit to use in concrete mixing, and even fewer limitations were applicable to curing-water quality. Tests were conducted by the Missouri River, South Atlantic, and Ohio River Division Laboratories, and the Waterways Experiment Station to determine the effects of pH values of water on the strength of concrete and the staining properties of elements found in water. It was found that various contaminants can render distilled water unfit for mixing or curing concrete. It is also indicated that pH does not provide a basis for specifying quality of mixing water. A procedure for evaluating curing waters for staining properties is presented in appendix A in which, for a preliminary evaluation, 3000 ml of the water are evaporated, and for a complete test 3 gal are evaporated. A digest of the literature is given in appendix B. (Author)

PB80-124878 PC A03/MF A01
Colorado State Dept. of Highways, Greeley. District Four Materials Section.
Performance of Low Quality Asphalt Pavements in Colorado.
Final rept. Oct 78-Oct 79,
Leo O'Connor. Aug 79, 47p CDOH-CDH-79-7, FHWA/CO/RD-79/7

This study was initiated to determine the cause or causes of low quality asphalt pavements in recent years using fine sand aggregates in eastern Colorado. Twenty-one projects were evaluated, some of which were good performers and some of which were poor. An evaluation team visited each project to observe and rate wheelpath rutting, shoving, raveling and cracking. Rutting, shoving, and associated bleeding were the major problems. Construction records were researched and pavement samples were tested in the Laboratory. The results include (1) Asphalts with more uniform distribution of components are performing better than others, (2) Lower asphalt penetrations yield higher performance, (3) Void content is inversely related to bleeding, (4) AC-10 grade asphalts vary considerably in hardness, (5) Bleeding occurs between 2.5 and 3% voids. The recommendations are that fine grained pavements should be designed for not lower than 6% voids and asphalt penetrations should be known before the selection of an asphalt grade from a particular source is made on each project.

PB80-125289 PC A05/MF A01
Transport and Road Research Lab., Crowthorne (England).
A System for the Fully Automatic Control of an Asphalt Mixing Plant,
Marilyn Burtwell, and R. Weeks. c1978, 98p TRRL-SUPPLEMENTARY-265

The report describes in detail a system of plant control designed at the Laboratory with the aim of improving the uniformity and compliance with specification of bituminous road materials. The system is modular and could easily be extended or adapted to other similar applications. It has been commissioned on the Laboratory's pilot-scale 'continuous dryer' asphalt mixing plant using a Kent 'K7O' process-control unit based on a 'PDP-8' mini-computer; these are described briefly. The flow charts of the system are reproduced in full. Limited trials of the system have shown it to be a useful and practical one; the weighing and temperature-control modules have been particularly successful. It is recommended that further comprehensive trials be carried out to prove the viability of the system and that the system should then be installed on a commercial plant for evaluation under industrial conditions. (Copyright (c) Crown Copyright 1978.)

PB80-125313 PC A04/MF A01
Colorado State Dept. of Highways, Denver. Materials Lab.
Base Stabilization with Foamed Asphalt.
Interim rept.,
Frank Abel, and Charles R. Hines. Jun 79, 62p CDOH-SMB-R-79-5, FHWA/CO/RD-79/5

This report describes a study of foamed asphalt aggregate mixtures used in base stabilization. Foamed asphalt stabilized base is a mixture of wet unheated mineral aggregates and asphalt cement mixed while the asphalt cement is in a foamed state. The Asphalt cement is brought to a foamed state by addition of small amounts (1.0 to 2.0 percent) of cold water piped into the hot asphalt cement line. The cold water is converted to steam by contact with the hot asphalt cement, thereby foaming the mixture. The foam is developed in a foaming chamber and sprayed through special nozzles into a pugmill type mixing chamber where it is mixed with unheated, damp aggregates. This mixture is then placed on the roadway with conventional construction equipment. At this point the material looks like and has the characteristics of wet untreated aggregate. After curing, the material appears more like an asphalt treated base. A range of strength coefficients for foamed asphalt treated base of 0.12 to 0.34 has been established by this limited study. Test results indicate that foamed asphalt mixes do offer a viable alternative in the construction of treated bases.

PB80-125776 PC A03/MF A01
Federal Highway Administration, Washington, DC. Materials Div.
Installation of Incinerator Residue as Base-Course Paving Material in Washington, DC.
Interim rept. Jun-Dec 77,
R. D. Pavlovich, H. J. Lentz, and W. C. Ormsby. Dec 77, 27p FHWA/RD-78-114

The use of municipal incinerator residue as aggregate in bituminous pavement construction was evaluated in the laboratory and in the field. A test installation, placed in Washington, D.C. in June 1977, consisted of a 4 1/2-in.(114.3mm) bituminous pavement composed largely of incinerator residue. The base was placed in two lifts and finished over compacted subgrade. The base was covered with 1 1/2-inches (38.1 mm) of a conventional bituminous srface course mixture. Details of the residue production, laboratory evaluation, asphalt plant operation, placement and finishing of the test installation, and recommendations and precautions for future projects using incinerator residue are given in this report. Preliminary results indicate that, with proper precautions, incinerator residue can be used as aggregate substitute or extender in bituminous base construction. However, even though it may be a technically viable aggregate material, its use will be determined by an interplay of economic, environmental, and energy factors.

PB80-804206 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Pavement Surface Properties. 1973-1979 (Citations from the NTIS Data Base).
Rept. for 1973-79,
Guy E. Habercom, Jr. Feb 80, 179p

The surface texture, finish, and roughness of rigid and flexible pavements are investigated for ride quality, noise, and skid resistance. Test equipment developed by highway departments for determining the surface properties are described. The equipment includes profilometers, roadometers and skid testers. (Contains 172 abstracts)

13D. Containers and Packaging

AD-A078 707/7 PC A02/MF A01
Air Force Packaging Evaluation Agency Wright-Patterson AFB OH
Evaluation of Packaging for the CN-1325/ASN-108 AHRS Displacement Gyro (F-15 Aircraft),
Frank C. Jarvis. Sep 79, 17p Rept no. PTPT-79-15

The packaging evaluation of the CN-1325/ASN-108 AHRS Displacement Gyro (F-15) revealed that the pack is not adequate to provide the 15 G shock protection level required for this item. The field tests confirmed the laboratory results which produced a maximum impact force of 21 Gs. A prototype pack with corner pad cushion inserts was evaluated and found to be suitable as an interim or a permanent replacement for packaging this item. (Author)

13E. Couplings, Fittings, Fasteners, and Joints

ESDU-79031 PC$578.50
Engineering Sciences Data Unit Ltd., London (England).
Endurance of Riveted Lap Joints (Aluminium Alloy Sheet and Rivets).
Data item.
c1979, 21p ISBN-0-85679-279-9
Also pub. as ISSN-0141-3996.
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

Fatigue endurance data is provided for riveted lap joints in aluminum alloy sheet. Life estimations of lightweight structures for aircraft, lightweight surface vessels, and other vehicles can be made from the data. The range of applicability is for aluminum alloy sheets and rivets where the geometrical ratios are in the ranges $d/t = 1.9$ to 4.4, $p/l = 0.5$ to 2.3 and $p/d = 3.1$ to 12.9.

13F. Ground Transportation Equipment

PB80-100795 MF$6.75
Caterpillar Tractor Co., Peoria, IL.
Application for Certification 1979 Model Year Heavy-Duty Diesel Engines - Caterpillar Tractor Co.
Oct 79, 8 sheets EPA/460/A-79/39
See also PB80-100803.
Also available in set of 3 reports MF$8.00, PB80-100787.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles or heavy-duty engines submits to EPA an application for certification. The application consists of two parts. In Part I, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. Part I also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. The Part II application submitted after emission testing is completed, contains the results of emission testing, a statement of compliance to the regulations, and maintenance instructions to be followed by the ultimate owners of the vehicles.

PB80-100803 MF$5.75
Isuzu Motors Ltd., Southfield, MI.
Application for Certification 1979 Model Year Heavy-Duty Diesel Engines - Isuzu Motors Ltd.
Oct 79, 3 sheets EPA/460/A-79/41
See also PB80-100795, and PB80-100811.
Also available in set of 3 reports MF$8.00, PB80-100787.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles or heavy-duty engines submits to EPA an application for certification. The application consists of two parts. In Part I, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. Part I also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. The Part II application submitted after emission testing is completed, contains the results of emission testing, a statement of compliance to the regulations, and maintenance instructions to be followed by the ultimate owners of the vehicles.

PB80-100811 MF$5.50
Mack Trucks, Inc., Hagerstown, MD.
Application for Certification 1979 Model Year Heavy-Duty Diesel Engines - Mack Trucks, Inc.
Oct 79, 2 sheets EPA/460/A-79/42
See also PB80-100803.
Also available in set of 3 reports MF$8.00, PB80-100787.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles or heavy-duty engines submits to EPA an application for certification. The application consists of two parts. In Part I, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. Part I also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. The Part II application submitted after emission testing is completed, contains the results of emission testing, a statement of compliance to the regulations, and maintenance instructions to be followed by the ultimate owners of the vehicles.

PB80-100829 MF$6.75
Isuzu Motors Ltd., Southfield, MI.
Application for Certification 1979 Model Year Light-Duty Vehicles and Trucks - Isuzu Motors Ltd.
Oct 79, 8 sheets EPA/460/A-79/40

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles or heavy-duty engines submits to EPA an application for certification. The application consists of two parts. In Part I, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. Part I also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. The Part II application submitted after emission testing is completed, contains the results of emission testing, a statement of compliance to the regulations, and maintenance instructions to be followed by the ultimate owners of the vehicles.

PB80-118896 PC **A02**/MF **A01**
Budd Co., Fort Washington, PA. Technical Center.
Material Applications in Future Automotive Structure. Volume I: Summary Report.
Final rept. Oct 76-May 79,
Herbert A. Jahnle. Apr 79, 21p TCR-0385-VOL 1, DOT-HS-805 064
Contract DOT-HS-6-01479

Candidate materials which might be used in future automotive structure were selected. These included steels, aluminum alloys, plastics and fiber reinforced composites. General materials property data, availability, manufacturability, cost and their effects on crashworthiness, durability and non damageability were evaluated. Three vehicle structures; body on frame, unibody and unibody van were investigated with the possible use of the candidate materials in mind. Finite element analysis and mass-spring modeling of the vehicle structures were completed to determine limits and boundaries of materials application. The existing structure with appropriate sectional properties were obtained from current production vehicles. New concepts were suggested using the candidate materials in several forms. Advantages, disadvantages, manufacturing costs and the general complexity of alternate applications were reviewed. Suggested typical weight savings which might evolve through the use of these materials were presented.

PB80-127384 PC **A08**/MF **A01**
Lea (N. D.) and Associates, Inc., Washington, DC.
Assessment of the Busch Gardens Automated Anheuser-Busch Shuttle System.
Final rept.,
Herbert A. Theumer, and Charles P. Elms. Nov 79, 166p UMTA-IT-06-0188-79-4
Contract DOT-UT-80025

This report describes an independent assessment of the operation of the shuttle system at the Busch Gardens theme park in Williamsburg, which has been in operation since 1975, and is part of the ride system in the park. The system connects two stations, the Garden Station at the theme park, and the Hospitality Center at the brewery. It is a single lane loop with one two-car train which stops on-line at each station, and is capable of operating in either the clockwise or counterclockwise direction. The information and data presented in this report were collected through surveys of literature, site visits, a visit to the manufacturer, and interviews with site and manufacturer's personnel. The report presents a description of the technical subsystems, as well as a review of performance, reliability, and maintainability. Where important, the review of technical subsystems includes applicability and modifications and/or improvements for application in an urban environment.

PB80-130636 PC **A12**/MF **A01**
Lea (N. D.) and Associates, Inc., Washington, DC.
Assessment of the Mueller Aerobus System: The System Installed and Operated for the Bundesgartenschau 1975, Mannheim, Germany.
Final rept.,
W. Bamberg, C. P. Elms, H. H. Hosenthien, and W. Voss. Sep 79, 262p UMTA-IT-06-0189-79-2
Contract DOT-UT-80002

This report describes the results of an assessment of the Mueller Aerobus System as it was installed and operated for the Bundesgartenschau 1975 (Federal Garden Show 1975) in Mannheim, Germany. This was the first application of this new transportation system which is based on cableway technology. It provided dual direction, scheduled passenger service between two distant points of the Garden Show, from April 18, 1975 to October 19, 1975. The report provides factual engineering information concerning the technical subsystems. System operational performance, system assurance, human interface, and safety and security were assessed. An evaluation of the distribution of capital and operating and maintenance costs, unit costs of service, and equivalent costs is presented. System development and implementation history are also summarized. Information and data for this study were collected from site visits, visits to the developer/manufacturer, interviews with representatives of the operator and system developer and other literature.

13G. Hydraulic and Pneumatic Equipment

AD-A078 662/4 PC **A05**/MF **A01**
Bendix Corp North Hollywood CA Electrodynamics Div
A Fluidic Adaptive Damper - Breadboard Design, Fabrication and Test.
Final rept.,
D. R. Cooper, R. K. VanAusdal, M. M. Steele, and S. M. Tenney. Jan 79, 76p TARADCOM-TR-12177
Contract DAAE07-76-C-3248
See also Rept. no. TARADCOM-12086.

The purpose of this development effort was to achieve a practical implementation of a fluidic composite valve to replace the compression valve of a conventional shock absorber to improve vehicle control and performance. The effort was to result in the delivery of two breadboard adaptive fluid vibration dampers (shock absorbers) for Government evaluation. Program results include the sizing, design, packaging, fabrication and testing of several modifications of a compact, inertially controlled arrangement of three parallel fluidic beam deflection amplifiers controlling a vortex. Fabrication techniques of the fluidic valve included photo-etching of steel amplifier discs that were diffusion bonded to form a sleeve for a conventional valve spool that serves as the inertial sensor. A unique two-electrohydraulic servovalve test circuit was produced that provided constant flow control over a wide range of load variations. Two breadboard vibration dampers, one assembled and one unassembled, were delivered to the Government for evaluation. (Author)

N80-14050/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Laser Anemometer Measurements in a Transonic Axial Flow Compressor Rotor.
A. J. Strazisar, and J. A. Powell. 1979, 17p NASA-TM-79323, E-279
Conf-Presented at 25TH Ann. Intern. Gas Turbine Conf. And 22D Ann. Fluids Engr. Conf., New Orleans, 9-13 Mar. 1970; Sponsored by Asme.

A laser anemometer system employing an efficient data acquisition technique was used to make measurements upstream, within, and downstream of the compressor rotor. A fluorescent dye technique allowed measurements within endwall boundary layers. Adjustable laser beam orientation minimized shadowed regions and enabled radial velocity measurements outside of the blade row. The flow phenomena investigated include flow variations from passage to passage, the rotor shock system, three-dimensional flows in the blade wake, and the development of the outer endwall boundary layer. Laser anemometer measurements are compared to a numerical solution of the streamfunction equations and to measurements made with conventional instrumentation.

N80-14051/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Modification of Axial Compressor Streamline Program for Analysis of Engine Test Data.
J. G. Williams. Nov 79, 49p NASA-TM-79312, E-268

An existing axial compressor streamline analysis computer program to allow input of measured radial pressure and temperature profiles obtained from engine or cascade data is described. The proposed modifications increase the input flexibility and are accomplished without changing the computer program's input format.

N80-14375/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Efficient Laser Anemometer for Intra-Rotor Flow Mapping in Turbomachinery.
J. A. Powell, A. J. Strazisar, and R. G. Seasholtz. 1979, 11p NASA-TM-79320, E-276
Conf-Proposed for Presentation at the Asme 25TH Ann. Intern. Gas Turbine Conf., and the 22ND Ann. Fluids Eng. Conf., New Orleans, 9-13 Mar. 1980.

A fringe type laser anemometer is described. Features of the anemometer include; a rapid and efficient data acquisition process; a detailed real time graphic display of the data being accumulated; and input laser beam positioning that maximizes the size of the intrarotor region being mapped. Results are presented that demonstrate the anemometer's capability in flow mapping within a transonic axial flow compressor rotor. A velocity profile, derived from 30,000 measurements along 1000 sequential circumferential positions covering 20 blade passages, was obtained in 30 seconds. The use of fluorescent seed particles allowed flow measurements near the rotor hub and the casing window.

13H. Industrial Processes

AD-A078 748/1 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab Hanover NH
Antifreeze-Thermodrilling for Core through the Central Part of the Ross Ice Shelf (J-9 Camp), Antarctica.
Igor A. Zotikov. Nov 79, 17p Rept no. CRREL-79-24

By using a new thermocoring technique, a hole was successfully drilled through the 416-m thickness of the Ross Ice Shelf at J-9 Camp. This report provides a description of the drill and an account of this drilling project. A provisional examination of the core shows the ice shelf to consist of 410 m of snow and glacial ice underlain by 6 m of sea ice formed by direct freezing of sea water to the bottom of the Ross Ice Shelf. (Author)

N80-14273/0 PC **A07**/MF **A01**
Optical Coating Lab., Inc., City of Industry, CA. Photoelectronics Div.
Assessment of Present State-of-the-ART Sawing Technology of Large Diameter Ingots for Solar Sheet Material.
Final Report, 1 Sep. 1977 - 28 Feb. 1978.
H. I. Yoo. 1978, 126p NASA-CR-162535, DOE/JPL-954830-78/2
Contract JPL-954830

Work is reported on: (1) slicing of the ingots with the multiblade slurry saw, the multiwire slurry saw and the I.D. saw, (2) characterization of the sliced wafers, and (3) analysis of add-on slicing cost based on Solar Array Manufacturing Industry Costing Standard.

PB80-108871 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Image Pattern Recognition in Industrial Inspection,
Gordon J. VanderBrug, and Roger N. Nagel. Sep 79, 49p NBSIR-79-1764

Most manufacturing processes require a visual inspection of some aspect of the process. In the most straight forward applications, a vision system is used to inspect for part completeness, or to check for flaws in the manufacturing product. In more sophisticated use of vision systems the inspection task may be secondary to tasks such as part location, identification, or determining part orientation. In general these tasks are important when the vision system is used in conjunction with a robot manipulator. In robot systems, vision is needed to allow the robot to acquire, manipulate, and inspect parts without the need for elaborate fixturing, or complex part delivery systems. The labor cost of manual inspection, and the high cost of special purpose part delivery systems for robots have led many manufacturers to investigate vision systems for use in manufacturing. Digital image processing and pattern recognition are providing the basis for a growing number of attempts to achieve an automated vision system. This paper begins with a brief historical perspective on image processing and pattern recognition. Next a series of state of the art examples of visual inspection system, and then robot vision systems is presented. The paper contains a list of other areas in manufacturing for the application of vision systems, and concludes with an assessment of the future of vision systems in manufacturing.

PB80-124142 PC **A03**/MF **A01**
SRI International, Menlo Park, CA. Artificial Intelligence Center.
Use of Sensors in Programmable Automation.
Technical note,
Charles A. Rosen, and David Nitzan. Apr 76, 36p TN-122, NSF/RA-761810
Grant NSF-GI-38100

This report reviews research and prototypical applications of sensors to automated material-handling, inspection, and assembly operations in batch-produced discrete part manufacturing. Sensors are needed for visual inspection of workpieces, for determination of identity, position, and orientation of unindexed workpieces, and for adaptive control of manipulator movements. The use of two types of sensors are discussed: contact (force, torque, and touch) sensors to search, recognize, grasp and move workpieces; and noncontact (proximity, electro-optical, and range) sensors to recognize, locate, and inspect workpieces or equipment. Photographs and drawings of the various types of sensors described are provided.

PB80-124985 PC **A03**/MF **A01**
Electricity Council Research Centre, Capenhurst (England).
Prospects of Drying with Radio Frequency and Microwave Electromagnetic Fields,
R. M. Perkin. Apr 79, 33p ECRC/M1235

The principles and techniques of radio frequency and microwave heating and their application to drying operations are outlined. The advantages and limitations of these methods are discussed.

PB80-125156 PC **A04**/MF **A01**
Electricity Council Research Centre, Capenhurst (England).
The Heat and Mass Transfer Characteristics of Boiling Point Drying Using Radio Frequency and Microwave Electromagnetic Fields,
R. M. Perkin. Aug 78, 65p ECRC/M1067

The first part of the memorandum discusses the general features of drying: a classification of solids is given and it is shown how the solutions of the heat and mass transfer equations provide criteria which determine the drying characteristics of conventional dryers. In the remainder of the memorandum, a heat and mass transfer model for boiling point dielectric drying is developed. The characteristics of the drying are obtained from the solutions to the heat and mass transfer equations. Criteria which describe the drying process are found and interpreted. A procedure for estimating the performance of a dryer operating under the conditions of the model is suggested. Finally the conditions used in the idealized model of the wet solid are compared with 'real' solids.

13I. Machinery and Tools

AD-A078 934/7 PC **A04**/MF **A01**
SKF Technology Services King of Prussia Pa
Establishment of Engineering Design Data for Hybrid Steel/Ceramic Ball Bearings.
Final rept. Apr 78-Aug 79,
F. R. Morrison, J. Pirvics, and T. Yonushonis. 28 Sep 79, 63p Rept no. SKF-AL79T033
Contract N00019-78-C-0304

A hybrid steel/ceramic angular contact ball bearing was designed for optimum performance at 2.5 x 10 to the 6th power DN. A lot of bearings was fabricated to this design and life tests were conducted under two different loads. A detailed failure aniaysis was completed to define the causes for the premature silicon nitride ball failures. (Author)

AD-A078 951/1 PC **A09**/MF **A01**
TRW Inc Cleveland OH Materials Technology
Exploratory Development of Die Materials for Isothermal Forging of Titanium Alloys.
Final technical rept. 1 May 76-30 Apr 79,
Charles S. Kortovich, and James M. Marder. Jul 79, 188p AFML-TR-79-4092
Contract F33615-76-C-5105

A program was conducted to develop materials for isothermal forging dies exhibiting higher yield strength and creep resistance than currently used nickel-base superalloy and molybdenum alloy compositions. The technical approach involves two phases, the first including alloy development aimed towards improved casting, powder metallurgy and metastable carbide alloy compositions and the second including the fabrication of tooling of the most promising die material/process for the F-15 trunnion drag brace arresting gear. The alloy development study included the evaluation of TRW-NASA VIA, TAZ-8A, IN-792 and IN-100 in terms of tensile, creep rupture and thermal fatigue tests as well as lubricant compatibility tests with typical isothermal forging lubricants. The results indicated that a modified TRW-NASA VIA casting composition offered the greatest potential for applicability as a die material.

ESDU-79021 PC**$674.50**
Engineering Sciences Data Unit Ltd., London (England).
Design of Disc Cams with Swinging Roller Followers: Calculation Methods.
c1979, 34p ISBN-0-85679-266-7
Also pub. as ISSN-0141-4046.
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

The report provides a systematic approach to the calculation of kinematic data for external disc cams with swinging roller followers. The cam assembly design is applicable to the machine tool and automobile engineering, mining equipment, printing, packaging, textile, and special purpose machinery. The design applies to all external disc cams with swinging roller followers. Topics considered include the following: Pressure angle calculations; Cam profile coordinate calculations; Pitch curve radius of curvature calculations; Cam profile cutting coordinate calculations; Reference and derivation; Examples.

ESDU-79023 PC**$770.50**
Engineering Sciences Data Unit Ltd., London (England).
Design of Disc Cams with Translating Flat-Faced Followers: Calculation Methods.
c1979, 28p ISBN-0-85679-268-3
Also pub. as ISSN-0141-4046.
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

The report provides a systematic approach to the calculation of kinematic data for external disc cams with translating flat-faced followers. The cams may be used for machine tool and automobile engineering, mining equipment, printing, packaging, textile, and special purpose machinery. The designs apply to all external disc cams with translating flat-faced followers.

PATENT-4 166 729 Not available NTIS
Department of the Navy Washington DC
Collector Plates for Electrostatic Precipitators.
Patent,
Joseph K. Thompson, Robert C. Clark, George H. Fielding, and Harold F. Bogardus. Filed 26 Jul 77, patented 4 Sep 79, 5p AD-D006 782/7, PAT-APPL-819 205
Supersedes PAT-APPL-819 205-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Collector plates for use in the second stage of a two-stage electrostaic precipitator comprise plates having non-conducting surfaces to which a coating of low conductivity, typically between 300 and 150,000 ohms per square, is affixed. One embodiment of such plates typically comprises a rigid, non-conducting plastic material coated with a material of low conductivity. Another embodimet of the present invention comprises a metallic plate coated with an insulating material of high dielectric strength, typically with a dielectric constant of at least 3000, to which the above mentioned low-conductivity coating is affixed. The collector plates may be mounted in such a manner as to maintain the airflow through the second stage of the precipitator in a direction virtually parallel to the surface of the plates. (Author)

PB80-106396 PC **A05**/MF **A01**
Purdue Univ., Lafayette, IN. School of Electrical Engineering.
Advanced Industrial Robot Control Systems.
Rept. no. 2, 1 Jan-1 Jul 78,
R. Paul, J. Luh, T. Anderson, J. Bender, and E. Berg. Jul 79, 92p TR-EE79-35, NSF/RA-790231
Grant NSF-APR77-14533
See also report dated May 78, PB-287 273.

This report describes work performed during the second six month period of a grant applied to advanced industrial robot control systems. The objectives of this work are to improve the performance of current industrial robots by developing a consistent theory and task description language. Work reported on here includes: the development of a simple joint motion control scheme to provide for the execution of structured robot task programs and to provide the capability of performing tasks on a moving conveyor; the integration of teaching into the task program; a direct on-line approach to motion time optimization; an approach to cartesian motion control of a manipulator employing a fast exact method.

PB80-803943 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Antifriction Bearings (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Dec 79,
Peter Moore. Jan 80, 24p
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations from the international literature provide descriptions of tribological studies of materials and designs that provide low friction performance. The articles include analyses and characterizations of bearing and lubricant systems. The environments considered entail temperatures from the cryogenic region to 900C and loads up to 20,000 psi. (Contains 77 citations)

13J. Marine Engineering

AD-A078 384/5 PC **A02/MF A01**
Massachusetts Inst of Tech Cambridge Ralph M Parsons Lab for Water Resources and Hydrodynamics
Reciprocity Relations for Offshore Structures Vibrating at Acoustic Frequencies,
C. C. Mei. 1979, 13p
Contract N00014-76-C-0214
Pub. in the International Conference on Behaviour of Off-Shore Structures (2nd), paper 56 p125-135 28-31 Aug 79.

No abstract available.

AD-A078 403/3 Not available NTIS
British Ship Research Association Wallsend (England) Wallsend Research Station
Journal of Abstracts of the British Ship Research Association. Volume 34, Number 2,
R. C. Kahler. Feb 79, 53p
See also Volume 34, Number 3, AD-A078 404.
Availability: B.S.R.A., Wallsend (England), Wallsend Research Station (No copies furnished by DTIC).

No abstract available.

AD-A078 404/1 Not available NTIS
British Ship Research Association Wallsend (England) Wallsend Research Station
Journal of Abstracts of the British Ship Research Association. Volume 34, Number 3, Abstracts 50,228-50,422,
R. C. Kahler. Mar 79, 68p
See also Volume 34, Number 4, AD-A078 405.
Availability: B.S.R.A., Wallsend (England), Wallsend Research Station (No copies furnished by DTIC).

No abstract available.

AD-A078 405/8 Not available NTIS
British Ship Research Association Wallsend (England) Wallsend Research Station
Journal of Abstracts of the British Ship Research Association. Volume 34, Number 4, Abstracts 50,423-50,602,
R. C. Kahler. Apr 79, 60p
See also Volume 34, Number 5, AD-A078 406.
Availability: B.S.R.A., Wallsend (England), Wallsend Research Station (No copies furnished by DTIC).

No abstract available.

AD-A078 406/6 Not available NTIS
British Ship Research Association Wallsend (England) Wallsend Research Station
Journal of Abstracts of the British Ship Research Association. Volume 34, Number 5, Abstracts 50,603-50,782,
R. C. Kahler. May 79, 58p
See also Volume 34, Number 6, AD-A078 407.
Availability: B.S.R.A., Wallsend (England), Wallsend Research Station (No copies furnished by DTIC).

No abstract available.

AD-A078 407/4 Not available NTIS
British Ship Research Association Wallsend (England) Wallsend Research Station
Journal of Abstracts of the British Ship Research Association. Volume 34, November 6, Abstracts 50,783-50,962,
R. C. Kahler. Jun 79, 65p
See also Volume 34, Number 7, AD-A078 408.
Availability: B.S.R.A., Wallsend (England), Wallsend Research Station (No copies furnished by DTIC).

No abstract available.

AD-A078 408/2 Not available NTIS
British Ship Research Association Wallsend (England) Wallsend Research Station
Journal of Abstracts of the British Ship Research Association. Volume 34, Number 7, Abstracts 50,963-51,142,
R. C. Kahler. 1979, 47p
See also Volume 34, number 8, AD-A078 409.
Availability: B.S.R.A., Wallsend (England), Wallsend Research Station (No copies furnished by DTIC).

No abstract available.

AD-A078 409/0 Not available NTIS
British Ship Research Association Wallsend (England) Wallsend Research Station
Journal of Abstract of the British Ship Research Association. Volume 34, Number 8, Abstracts 51,143-51,322,
R. C. Kahler. 1979, 73p
See also Volume 34, Number 7, AD-A078 408.
Availability: B.S.R.A., Wallsend (England), Wallsend Research Station (No copies furnished by DTIC).

No abstract available.

AD-A078 410/8 PC **A05/MF A01**
Naval Postgraduate School Monterey CA
Development of a Six Degree of Freedom Motion Simulation Model for Use in Submarine Design Analysis.
Master's thesis,
John Thomas Hammond. May 78, 87p

A computer mathematical model that will simulate the six degree of freedom motion of a submarine has been developed. Hydrodynamic coefficients obtained from the testing of physical models enable the user to accurately simulate specific submarine designs. The simulation model can be used as a design tool to study and predict submarine dynamic response. Complete three dimensional motion is allowed for the submarine while constraints in powering, rudder deflection, dive plane angle, and response time can be selected by the user. Outputs include a chronological history of all linear and angular velocities and accelerations, the instantaneous angle of deflection of each control surface, and the trajectory of the submarine center of gravity. (Author)

AD-A078 422/3 PC **A05/MF A01**
Construction Engineering Research Lab (Army) Champaign IL
Habitability Improvements for Aircraft Carrier Messdecks.
Final rept.,
Robert L. Porter. Oct 79, 77p Rept no. CERL-TR-E-156

This report discusses the design and evaluation of improvements to messdeck layouts and other physical components on the U.S. Navy carrier ship, U.S.S. Saratoga. These components were designed to minimize the increased negative impacts of three 'given' conditions that result from a substantial addition of crew and equipment to a fixed-space environment. The 'given' conditions are: (1) high density, (2) multi-use of spaces, and (3) nondiner circulation through messdeck areas. This research also considered possible applications of the improvements to other U.S. Navy carriers. The components were designed to improve the crew's perception of privacy, efficiency, comfort, and dining area image. Surveys of the crew after these improvements had been implemented indicated positive user response to the modifications. (Author)

AD-A078 497/5 PC **A02/MF A01**
George Washington Univ Washington DC School of Engineering and Applied Science
Research on Cryptosteady-Flow Thrust Generators.
Final rept. 1 Jan 76-30 Nov 79.
Dec 79, 20p
Contracts N00014-76-C-0649, N00014-78-C-0454

This study focussed, from the start, on the 'rotary-jet' thrust augmenter, as developed at Rensselaer and tested at MacDonnell-Douglas, Grumman, the Naval Air Propulsion Test Center, and other facilities. In this device the primary (or driving) flow is discharged into the interaction space through skewed nozzles on the periphery of a free-spinning rotor, thereby forming the helical rotating patterns that are sometimes referred to as 'pseudoblades' The idea here is not to promote mixing (although this may be a side benefit), but rather to generate and utilize an additional mechanism for the transfer of mechanical energy from the primary to the secondary flow. This additional mechanism is 'pressure exchange'--the work of interface pressure forces. Since the pressure exchange component of energy transfer is essentially nondissipative, the performance of the rotary jet can be expected to be better than that on the conventional ejector--a fact that had already been confirmed experimentally prior to the start of this project.

AD-A078 502/2 PC **A09/MF A01**
National Academy of Sciences-National Research Council Washington DC
Responding to Casualties of Ships Bearing Hazardous Cargoes.
1979, 180p
Contract N00014-77-C-0796

There has been a sharp and continuing increase in the volume of hazardous cargo transported by water. Acknowledging the risks, manufacturers and shippers, along with federal and state governments, have made commendable efforts to prevent casualties that involve dangerous cargoes. In reply to these concerns, the National Research Council's Marine Board undertook an assessment of current capability, both technical and institutional, for responding to casualties involving ships carrying hazardous cargoes. In February 1978, the Marine Board established a Panel on Response to Casualties Involving Ship-Borne Hazardous Cargoes to undertake the assessment. This report presents the results of that assessment. Three case studies were developed and analyzed: (1) A casualty on the Ohio River in which a towboat pushing barges of anhydrous ammonia struck a bridge abutment near Louisville, Kentucky; (2) A collision between a liquefied natural gas tanker and a container ship in nearshore open ocean in the vicinity of Savannah, Georgia; and (3) A collision between a Navy ammunition and explosives carrier and a bulk sugar carrier on the lower Sacramento River near San Francisco Bay.

AD-A078 507/1 PC **A04/MF A01**
Naval Postgraduate School Monterey CA
Lift Analysis on the Bow Seal of the Surface Effect Ship Testcraft XR-3.
Master's thesis,
James R. Snider. Sep 79, 54p

Experimental test runs were conducted to determine lift forces acting on the bow seal of the captured air bubble testcraft, XR-3. These forces, plotted versus turn rate for varying center-of-gravity locations, are presented and analyzed. (Author)

AD-A078 605/3 MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD Ship Performance Dept
A Nonlinear Mathematical Model of Motions of a Planing Boat in Irregular Waves,
Ernest E. Zarnick. Sep 79, 61p Rept no. DTNSRDC/SPD-0867-01
Availability: Microfiche copies only.

A computer program previously developed to estimate the motions and accelerations of a planing craft in regular waves was modified and extended to compute the corresponding motions in random or irregular waves. Ten regular waves with random phase were combined to represent the random seaway. The amplitudes and frequencies that were selected represent the energy distribution of a Pierson-Moskowitz spectrum for a fully developed sea. A comparison of computed results with experiment indicates that the computer program can predict craft behavior with reasonable quantitative accuracy in moderate operating conditions. In severe operating conditions, however, the amplitudes of the computed vertical accelerations, which include impacts, are one-half of the experimental values. (Author)

AD-A078 636/8 PC **A02/MF A01**
Materials Research Labs Ascot Vale (Australia)
Corrosion in the Australian Defence Scene. 2. The Navy,
Jeffrey J. Batten. Aug 79, 20p Rept no. MRL-R-753

This report concludes that most of the corrosion problems experienced by the steel components of

a ship may be attributed to design shortcomings. These problems have arisen because satisfactory protective coatings could not be applied over inadequately prepared surfaces due to their lack of accessibility. Corrosion problems involving metals other than steel are also attributed to design faults. Thus most of the corrosion problems encountered result from a lack of application of existing technology. Research of a basic nature is still needed in areas such as hot corrosion in gas turbines, inhibitors for cooling systems, coatings for magazine decks, and materials for sea water systems. (Author)

AD-A078 641/8 PC **A05**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme CA
Design for Implosion of Concrete Cylinder Structures Under Hydrostatic Loading.
Rept. for Jul 78-Mar 79,
Harvey H. Haynes. Aug 79, 85p Rept no. CEL-TR-874

This report presents updated design guides for both thick- and thin-walled concrete cylinder structures under hydrostatic loading. The design approach for thick-walled cylinders has been changed from that described in previous work to a semi-empirical basis; improvements in implosion strength on the order of 10% are found. A test on a thick-walled 10-ft-diam (3.05-m) structure loaded to failure in the ocean is reported. A major change in the guide is for thin-walled cylinders, where new data on 15 relatively large-scale specimens are reported. Design guides for thin-walled cylinders show an increase in implosion strength ranging from 0% to 35%, depending on the structures' tDo and L/Do ratios, from that reported previously. (Author)

AD-A078 740/8 PC **A03**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme Ca
Underwater Inspection of Fleet Moorings.
Final rept. Mar-Sep 78,
J. F. Wadsworth, III. Jul 79, 26p Rept no. CEL-TN-1557

This report is a guide for divers engaged in underwater inspections of the Navy's Fleet moorings. These inspections are conducted to report the physical condition of the moorings. Engineering and maintenance assessments are made by engineers using the inspection data. Procedures and equipment to be used by the diver are given. Forms for documentation of the data with examples are included. It is strongly recommended that the diving inspection team be accompanied by the engineer responsible for writing the report recommending maintenance actions on the moorings. (Author)

PB80-132459 PC **A04**/MF **A01**
Oregon State Univ., Corvallis. Dept. of Agricultural Engineering.
Cathodic Protection for Boats in Sea Water: A Review of Recommendations.
Sea Grant coll. program,
Michael H. Mallon, and Edward R. Kolbe. Oct 79, 55p ORESU-T-79-003, NOAA-79120414

Two cathodic protection techniques are commonly used to control the corrosion of salt water vessels: (1) attaching sacrificial metals such as zinc; and (2) using impressed current devices which are driven from the vessel's power supply. The advice of science and industry gained through interviews, a series of seminars, and a collection of literature is summarized in this publication. Recommendations on the application of these techniques are made. Several factors can significantly influence the success of these techniques. A few examples are: stray currents from faulty electrical systems on the boat or dock (leading to stray current corrosion), the quality and integrity of the paint systems, types of metals and materials used, installation practices, hull materials, and water salinity.

PB80-804719 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Recreational Boating (Citations from the NTIS Data Base).
Rept. for 1964-Jan 80,
Mary E. Young. Feb 80, 266p
Supersedes NTIS/PS-79/0057, NTIS/PS-78/0072, and NTIS/PS-77/0041.

Topics include marina management and planning, boat insurance, pollution, safety equipment, and regional planning for boating facilities. (This updated bibliography contains 259 abstracts, 30 of which are new entries to the previous edition.)

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

N80-14402/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Piping and Tubing Technology: A Compilation.
1967, 20p NASA-SP-5903(01), C-67-03

Piping and tubing techniques which have potential industrial use are presented in summary form.

PB80-126147 PC **A05**/MF **A01**
California Univ., Davis. Crocker Nuclear Lab.
Ambient Aerosol Sampling with Stacked Filter Units.
Final rept.,
T. A. Cahill, R. A. Eldred, J. Barone, and L. Ashbaugh. Feb 79, 83p FHWA-RD-78-178
Contract DOT-FH-11-9238

Studies were conducted on the use of Nuclepore filters to perform a dichotomous particle size separation in ambient aerosols. Optimization of the resulting stacked filter unit was undertaken, with incorporation of information from theoretical analyses, laboratory studies, and tests in a variety of ambient conditions. The stacked filter unit was improved by development of antibounce coatings for the coarse filter, incorporation of a new fine filter developed by the Nuclepore Corporation, and addition of a pneumatic constant flow device. The unit has been shown to quantitatively collect particles between 2.5 micrometers and 15 micrometers on the coarse filter, and 0 to 2.5 micrometers on the fine filter, with a separation curve similar to that of the human respiratory tract. Stacked filter units weigh about 15 kg., and total cost of components for the basic unit is about $200.

13L. Safety Engineering

PB80-125214 PC **A06**/MF **A01**
IIT Research Inst., Chicago, IL.
The Effectiveness of Duct-Installed Smoke Detectors in Two Different Ventilation System Configurations.
Final rept.,
Thomas E. Waterman, and Kim R. Miniszewski. 26 Feb 79, 114p GSA/PBAC-78-127
Contract GS-00B-2217
Color illustrations reproduced in black and white.

Two full-scale fire experiments were conducted to determine the responsiveness of various duct smoke detectors (percent of alarm voltage) prior to sprinkler waterflow during a developing fire which originates in the wastebasket of a typical office work station in a Federal building. In one test, two work stations mockups were set up in a small room having ducted supply air with the return air path through the door opening into the corridor and through a return air grille to the air handler. In the other test, a large open office area was simulated with two work stations mockups. Supply air was discharged through ceiling diffusers and the space above the suspended ceiling served as a return air plenum to the return air duct. In these tests, the duct detectors did not provide any significant advantage over sprinkler waterflow for alarm initiation or other automatic action such as, smoke control activation or shut down of the air handlers.

PB80-125974 PC **A11**/MF **A01**
Building Technology, Inc., Silver Spring, MD.
Evaluation and Analysis of Current Effective Building and Fire Prevention Code Administration and Enforcement Programs.
Final rept.,
John G. Degenkolb. Aug 79, 236p
Contract FA-78-1030
Prepared in cooperation with Green (Melvyn) and Associates, Inc., and Degenkolb (John G.).

This report was designed to provide communities, including their code enforcement and administration personnel, administrations, and elected officials with a method for analysis and improvement of code administration and enforcement techniques with respect to safety. The study methodology entailed the selection and analysis of nine communities recognized as having especially effective code administration and enforcement. Analysis of the communities produced a list of essential features which should be present in an effective program, and a list of features which might improve the effectiveness of a code administration and enforcement program under certain conditions. The great variety of community characteristics, however, does not make the preparation of 'model programs' possible. The study divided the code administration and enforcement processes into a new building development and construction phase and a building maintenance and use phase. The former entails all regulatory steps in the design, submission, and processing flow which are encountered by an applicant, builder, or developer. The latter encompasses all activities such as record keeping and review, keeping up with occupancy or use changes, fire brigade training, special permit issuance, inspection, issuance of summons, and prosecution of violators. Techniques for improved productivity and communications also are included.

PB80-127426 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Arson: America's Malignant Crime.
Final rept.,
John T. Suchy. Sep 76, 43p
Sponsored in part by Fire Administration, Washington, DC.

This report details the results of seminars designed to determine needs and actions required to initiate a coordinated attack on the Nation's arson problem. Nine specific needs were identified: to develop and define the responsibilities of all who should be concerned about the arson problem: to reclassify arson in crime reporting systems to reflect its true seriousness; to make all segments of the public aware of arson and its consequences, and the need for action; to develop and apply job-related training programs on arson for investigators and all other categories of concerned personnel; to develop and apply better reporting, data collection and data analysis procedures; to promulgate and apply effective, uniform regulations and practices particularly insurance regulations and practices; to identify and develop adequate sources of funding to combat arson at all levels; to conduct research and development on tools for arson investigation and on social and behavioral causes of arson; to develop a uniform arson terminology for all disciplines in all parts of the U.S.

PB80-128424 PC **A23**/MF **A01**
Jensen (Rolf) and Associates, Inc., Deerfield, IL.
Study to Establish the Existing Automatic Fire Suppression Technology for Use in Residential Occupancies.
Final rept.
Sep 78, 529p
Contract NFPCA-6-35587

This report describes a study to establish the extent to which currently available automatic suppression systems will be effective in reducing the national residential fire loss. It further identifies areas where systems can be improved to be more acceptable and useful in response to this basic objective. The character of residential fire (in single and multi-family dwellings) was established by a review of available fire records and research information, and candidate systems were selected from available suppression systems. Three specific systems were chosen and evaluated to determine the factors that would influence their acceptance by users (occupants or owners) by insurance companies, regulating agencies, developers, designers, builders, installers, and manufacturers. It was determined that the national residential fire loss could be reduced by more than 50% if suppression systems could be installed in all residences by 1990. Potential improvements to make these systems more acceptable and responsive to the residential fire problem were made with respect to the development of 'package systems', studies to develop more effective and less expensive residential sprinkler systems, the modification of existing national standards, public education, and the establishment of a standardized residential fire test procedure.

PB80-133390 PC A07/MF A01
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Fire Technology Abstracts. Volume 1, Cumulative Indexes.
1978, 129p
See also Volume 1, Numbers 1/2, PB-263 957.
Prepared in cooperation with Federal Emergency Management Agency, Washington, DC.

The annual cumulative index for Volume I (July 1977-June 1978) of the bimonthly abstracts journal, Fire Technology Abstracts, consists of four sections: author, subject, source and report-number indexes. The author index lists both principle and secondary authors cited in the abstracts section, and the subject index is composed of up to three hierarchic descriptive levels characterizing the nature of the subject content. The source index lists entries under the headings: Books, Codes, Conferences, Congresses, Dissertations, Journals, Meetings, Patents, Reports, Seminars, Standards, and Symposia. The report index lists in alphanumeric order the numbers of all the reports entered in each issue. Also included is an expansion of journal abbreviations used in the abstracts.

PB80-133408 PC A08/MF A01
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Fire Technology Abstracts. Volume 2, Issue 1/2, July-October 1977.
1977, 158p
Prepared in cooperation with Federal Emergency Management Agency, Washington, DC.

Issued bimonthly, the journal provides a comprehensive reference to the applied fire literature found in a wide variety of sources (journals, books, codes, etc.), particularly the report and patent literature. The six issues of each volume contain complete bibliographic descriptions of the content of the items, usually the author's abstract or summary, and are classified under thirteen main categories as follows: (1) General category; (2) dynamics and mechanics of fire; (3) behavior and properties of materials; (4) fire modeling and testing; (5) fire protection of structures; (6) fire safety; (7) fire service organization and facilities; (8) fire ground operations; (9) planning; (10) human behavior, social and medical problems; (11) codes, standards, safe handling, identification of hazards; (12) insurance, economics of loss and prevention; and (13) statistics. Although the English-language literature comprises the majority of the entries, coverage includes selections from around the world, especially the U.K., U.S.S.R., and Germany.

PB80-133416 PC A06/MF A01
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Fire Technology Abstracts. Volume 2, Number 3, November-December 1977.
1977, 113p
Prepared in cooperation with Federal Emergency Management Agency, Washington, DC.

The issue contains complete bibliographic descriptions of the content of the items, usually the author's abstract or summary, and are classified under thirteen main categories as follows: (1) General category; (2) dynamics and mechanics of fire; (3) behavior and properties of materials; (4) fire modeling and testing; (5) fire protection of structures; (6) fire safety; (7) fire service organization and facilities; (8) fire ground operations; (9) planning; (10) human behavior, social and medical problems; (11) codes, standards, safe handling, identification of hazards; (12) insurance, economics of loss and prevention; and (13) statistics. Although the English-language literature comprises the majority of the entries, coverage includes selections from around the world, especially the U.K., U.S.S.R., and Germany.

PB80-133424 PC A06/MF A01
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Fire Technology Abstracts. Volume 2, Number 4, January-February 1978.
1978, 117p
Prepared in cooperation with Federal Emergency Management Agency, Washington, DC.

The issue contains complete bibliographic descriptions of the content of the items, usually the author's abstracts or summary, and are classified under thirteen main categories as follows: (1) General category; (2) dynamics and mechanics of fire; (3) behavior and properties of materials; (4) fire modeling and testing; (5) fire protection of structures; (6) fire safety; (7) fire service organization and facilities; (8) fire ground operations; (9) planning; (10) human behavior, social and medical problems; (11) codes, standards, safe handling, identification of hazards; (12) insurance, economics of loss and prevention; and (13) statistics. Although the English-language literature comprises the majority of the entries, coverage includes selections from around the world, especially the U.K., U.S.S.R., and Germany.

PB80-133432 PC A06/MF A01
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Fire Technology Abstracts. Volume 2, Number 5, March-April 1978.
1978, 117p
Prepared in cooperation with Federal Emergency Management Agency, Washington, DC.

The issue contains complete bibliographic descriptions of the content of the items, usually the author's abstract or summary, and are classified under thirteen main categories as follows: (1) General category; (2) dynamics and mechanics of fire; (3) behavior and properties of materials; (4) fire modeling and testing; (5) fire protection of structures; (6) fire safety; (7) fire service organization and facilities; (8) fire ground operations; (9) planning; (10) human behavior, social and medical problems; (11) codes, standards, safe handling, identification of hazards; (12) insurance, economics of loss and prevention; and (13) statistics. Although the English-language literature comprises the majority of the entries, coverage includes selections from around the world, especially the U.K., U.S.S.R., and Germany.

PB80-133440 PC A06/MF A01
Johns Hopkins Univ., Laurel, MD.
Fire Technology Abstracts. Volume 2, Number 6, May-June 1978.
1978, 111p
Prepared in cooperation with Federal Emergency Management Agency, Washington, DC.

The issue contains complete bibliographic descriptions of the content of the items, usually the author's abstract or summary, and are classified under thirteen main categories as follows: (1) General category; (2) dynamics and mechanics of fire; (3) behavior and properties of materials; (4) fire modeling and testing; (5) fire protection of structures; (6) fire safety; (7) fire service organization and facilities; (8) fire ground operations; (9) planning; (10) human behavior, social and medical problems; (11) codes, standards, safe handling, identification of hazards; (12) insurance, economics of loss and prevention; and (13) statistics. Although the English-language literature comprises the majority of the entries, coverage includes selections from around the world, especially the U.K., U.S.S.R., and Germany.

PB80-133457 PC A06/MF A01
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Fire Technology Abstracts. Volume 3, Number 1, July-August 1978.
1978, 109p
Prepared in cooperation with Federal Emergency Management Agency, Washington, DC.

The issue contains complete bibliographic descriptions of the content of the items, usually the author's abstract or summary, and are classified under the thirteen main categories as follows: (1) General category; (2) dynamics and mechanics of fire; (3) behavior and properties of materials; (4) fire modeling and testing; (5) fire protection of structures; (6) fire safety; (7) fire service organization and facilities; (8) fire ground operations; (9) planning; (10) human behavior, social and medical problems; (11) codes, standards, safe handling, identification of hazards; (12) insurance, economics of loss and prevention; and (13) statistics. Although the English-language literature comprises the majority of the entries, coverage includes selections from around the world, especially the U.K., U.S.S.R., and Germany.

13M. Structural Engineering

AD-A078 895/0 MF A01
Kimball (L Robert) and Associates Ebensburg Pa
National Dam Inspection Program. Beaver Lake Dam (NDS I.D. Number PA-354, DER I.D. Number 41-10), Beaver Lake Enterprises, Susquehanna River Basin, Beaver Run, Lycoming County, Pennsylvania. Phase I Inspection Report,
R. Jeffrey Kimball. Aug 79, 82p
Contract DACW31-79-C-0009
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Beaver Lake Dam is an earthfill dam with a vertical concrete wall forming the upstream slope and a vertical stone wall forming the downstream slope. The material between the two walls is earth. The crest width is approximately 12 feet. The dam is 179 feet long and approximately 9 feet high. The dam crest is curved concaved in an upstream direction. The right abutment is very gently sloping. The spillway is located in the center of the dam and is 19 feet long. There are no outlet pipes or drain facilities in the dam.

ESDU-79032 PC$290.50
Engineering Sciences Data Unit Ltd., London (England).
Stress Concentrations at Grooves for Retaining Rings or Seals (with Notes on Design Against Fatigue).
c1979, 10p ISBN-0-85679-281-0
Also pub. as ISSN-0141-4089 and ISSN-0141-4097.
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

The purpose is to provide the maximum stress arising in circumferentially grooved cylindrical members under tension, bending, or torsion, and to give guidance on the use of the data for estimating the fatigue strength. Applications include gear box shafts carrying retaining rings, pipes using 'O' seals at junctions. Range of applicability is the following: Elastic isotropic materials; Groove proportions of depth to width ratio between 0.5 and 6.0 and radius to depth ratio between 0.2 and 0.03; External to internal grooves of depth less than 1/5 of wall thickness but whose depth is small in relation to the diameter.

PB80-125925 PC A08/MF A01
Lehigh Univ., Bethlehem, PA. Fritz Engineering Lab.
Composite Steel - Concrete Design. A Comparison of the Monograph on Tall Buildings, AISC-ACI, BS5400 and the German Code of Practice for the Design of Steel Composite Beams,
Ah-Kum Pang. May 79, 173p LEHIGH/FL/440-4
Grant NSF-PFR78-16324

Composite steel-concrete construction is common in various countries. This report presents the results of a comparative study of the provisions of the codes and specifications pertaining to design and construction of composite structures of three countries: U.S.A., United Kingdom, and Germany. These provisions cover the design of composite beams both simply supported and continuous, encased beams, composite box girders, composite columns and formed metal deck. To illustrate the difference between the codes, two design examples, one on beam design and the other on column design are worked out using the American and British codes. In column design the second example indicates that though the design methods are quite different nevertheless the final designs by both methods do not differ appreciably.

PB80-135684 PC A03/MF A01
National Bureau of Standards, Washington, DC. National Engineering Lab.
Housing Conservation Technology: Executive Summary and Recommendations.
F. Eugene Metz, Harvey W. Berger, and Thomas H. Boone. Jul 77, 45p HUD-0000363

American homeowners often do an inadequate job of conserving their dwellings because they do not

know what should be done and because current technologies often cannot be used by do - it - yourselfers. There are also gaps in the technology available for home maintenance and repair. A series of tables evaluate current technology for 11 critical building elements, plus repair and revnovation technology as a whole. These tables summarize the skills needed for use of the technique, the means of installation, and advantages and disadvantages. Topics covered are roofing, exterior cladding, windows, insulation, basement waterproofing, floor and wall underlayments (wet areas), structural framing, heating and cooling systems, plumbing systems, electrical systems, and appliances. Technologies which will enable the homeowner to quickly measure the moisture accumulating under the roof or to evaluate the quality of the home's wiring do not exist; better waterproofing materials are also needed for basements and other wet areas. Little information is available on the durability of various exterior products and window frame security has received little attention. Insulation technology is in a state of flux. Here the homeowner especially needs full information to make an informed decision. Renovation involves special problems because old houses were frequently built out of plumb and settling adds to the problems encountered in using prefabricated materials. Do - it - yourselfers are often the first to use technology; however, conservative lenders and housing codes often hinder such innovation.

PB80-135692 PC **A08**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Housing Conservation Technology.
F. Eugene Metz, Harvey W. Berger, and Thomas H. Boone. Jul 77, 167p HUD-0000364

Mainly a detailed assessment of the technologies available for dwelling repair, replacement, and renovation, this report focuses on single - family homes and multi - family structures containing up to 20 dwelling units. American homeowners generally handle most repair and maintenance either by doing the work themselves or by calling small contractors for one job at a time. The owner frequently does an inadequate job of conserving the dwelling, not only because maintenance is expensive, but also because current information does not tell what must be done and what the advantages and disadvantages of various technologies are, and does not present the cost data necessary for an informed decision. A state - of - the - art review surveys both the technologies and information available to the homeowner for 11 critical building elements: roofing, exterior cladding, windows, insulation, basement waterproofing, floor and wall underlayments (wet areas), structural framing, heating and cooling systems, plumbing systems, electrical systems, and appliances. Technologies to help the owner handle major jobs such as measuring the amount of moisture under a roof or evaluating house wiring do not exist. In other areas, the technology either has advanced little or is in such a state of flux that data is confusing. Renovation and repair offer additional problems because old houses were often built out of plumb so that settling compounds the problems. A chart lists cost manuals for renovation work. A final section covers the effects of conservative lenders and building codes on innovation. An extensive bibliography is appended.

PB80-135874 PC **A06**/MF **A01**
Stevens Inst. of Tech., Hoboken, NJ. Center for Municipal Studies and Services.
Innovative Mechanical Systems for the Hoboken Transportation Center.
Final rept.,
Richard B. Cole, Mayme P. Jurkat, Irmin O. Kamm, and Thomas P. Konen. Dec 77, 105p HUD-0000509
Contract HUD-H-2196R

In the summer of 1977, the Hoboken Community Development Agency requested the Center for Municipal Studies and Services of the Stevens Institute of Technology to study the use of appropriate and innovative mechanical system concepts for the Erie - Lackawanna Railroad and Ferry Terminal Building. This report conveys the findings of the study, which specifically pertains to recommendations for the construction of a heating - ventilation - air - conditioning system. The introduction summarizes the findings of a 1975 engineering survey of the terminal performed by a firm of architects and planners. That study examined foundations, structural supports, roof, and copper cladding, and assessed the condition of each. The historical background of the building, and existing conditions and environment are then discussed. It is noted that only limited improvement in the thermal performance of the building envelope is possible without disrupting either the (historic) exterior or the interior appearance of the building. Such disruption would not be acceptable, since the building, built in 1905, has been named to the Register of National Historic Sites. A description and analysis of the proposed transportation center is presented, and alternative mechanical systems for space heating and cooling are discussed. Based on study evaluations, it is recommended that building and site - use planning and evaluation should proceed on the basis of cost estimates for energy and utilities appropriate for conventional heating and cooling systems, water - supply and waste - disposal systems, and other mechanical systems. The findings do not justify the use of innovative systems. Tabular and graphic data are provided in the appendices. References are also included.

14. METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A078 289/6 PC **A03**/MF **A01**
Arnold Engineering Development Center Arnold Afs TN
Laser-Raman Flow-Field Diagnostics of Two Large Hypersonic Test Facilities.
Final rept. 13 Apr 77-10 Jul 78,
W. D. Williams, D. A. Wagner, H. M. Powell, and L. L. Price. Dec 79, 41p Rept no. AEDC-TR-79-88
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

Laser-Raman scattering has been utilized to discover nonequilibrium N2 vibrational levels in a continuous, resistance-heated wind tunnel (Tunnel C) and in an arc-heated wind tunnel (Tunnel F). Vibrational temperatures of up to two times the bulk reservoir temperature have been measured in the Tunnel F free stream. A double-diaphragm device for delay of the Tunnel F nozzle expansion was found to significantly reduce the vibrational temperature level. In tunnel C, the vibrational temperatures were found to be dependent upon the water vapor concentration in the flow. It is hypothesized that water vapor-induced de-excitation of the vibrationally excited nitrogen molecules results in a significant rise in local static temperature and corresponding reduction in Mach number. (Author)

AD-A078 451/2 PC **A03**/MF **A01**
Stanford Univ CA Edward L Ginzton Lab
Acoustic Microscopy with Microwave Frequencies,
A. Atalar, V. Jipson, R. Koch, and C. F. Quate. 1979, 29p GL-2884, AFOSR-TR-79-1108
Contract F49620-78-C-0098
Pub. in Annual Review of Materials Science, v9 p255-281 1979.

No abstract available.

AD-A078 463/5 PC **A04**/MF **A01**
Stanford Univ CA Edward L Ginzton Lab
Research on Nondestructive Testing.
Final rept. 1 Sep 78-31 Aug 79,
G. S. Kino. Oct 79, 51p GL-3049, AFOSR-TR-79-1261
Grant AFOSR-78-3726

The aim of this year's work has been to establish new techniques for measuring the properties of materials with the ultimate aim of determining material properties such as hardness and yield strength and being able to predict the life and servicibility of mechanical structures. We have limited ourselves to acoustic measurement techniques. Our purpose is to correlate the results of acoustic measurements with the mechanical properties of the material of interest. Teh project has been divided into two parts: (1) the characterization of microstructure by acoustic NDE, and (2) the measurement of stress states by acoustic NDE. (Author)

AD-A078 494/2 PC **A05**/MF **A01**
Jet Propulsion Lab Pasadena CA
Monitoring of LNG Vapors - Phase I.
Final rept.,
E. D. Hinckley. 31 Mar 79, 85p USCG-D-71-79
Contract DOT-CG-822868-A

This report documents the development and subsequent field testing of two rapid response instruments for the detection of methane gas in the vapor resulting from an LNG spill. The instruments were: a laser instrument with a 0.005 second response time and 0.1% sensitivity, and a two-band differential radiometer (TBDR) with a 0.15 second response time and 1% sensitivity. A thermistor sensor was also developed for the rapid (0.2 second) measurement of vapor temperature. The implementation of this instrumentation for Spill Tests LNG-18, LNG-19, LNG-20 and LNG-21 at China Lake, California is also described in this report. Some comparisons were made between the JPL measurements and those of other organizations involved in the China Lake test program. Good correlation was found, for example, between the laser methane measurement and that of a nearby sensor during LNG-18. During LNG-21 the vapor temperature of methane was also measured and found to be linearly related to the methane concentration over the 2-10% range. In addition to the two methane concentration instruments, progress in the laboratory associated with this program was made on the development of a modified TBDR device to measure the concentration of oxygen in the vapor cloud, and in the development of infrared fiber-optics for advanced laser detection of methane and other species. (Author)

AD-A078 686/3 PC **A05**/MF **A01**
Battelle Columbus Labs OH
Methodology for Making a Self-Absorption Correction to the Simple Copper-Line-Ratio Technique Used for Arc-Tunnel Enthalpy Measurements.
Final rept. Oct 77-Oct 78,
Anthony A. Boiarski. Oct 79, 77p AFFDL-TR-79-3122
Contract F33615-76-C-3145

Detailed theory and analytical procedures are presented which provide a method for self-absorption correction of the simple 5106/5153 angstrom copper-line-ratio technique used to measure arc-tunnel stagnation enthalpy. This correction procedure involves simultaneous measurement of the 5106 angstrom line full half-width in order to infer copper number density and gas temperatue from the self-absorption broadened line profile shape, and the simple one intensity ratio. Theoretical formulations of other dominant line-broadening contributions (i.e., Doppler, Van der Waals, and Stark effects) are also included in order to accurately determine the degree of line broadening that results from self-absorption alone. Typical data reduction curves are presented to demonstrate the correction process. These curves indicate that large errors in measured enthalpy could result if self-absorption was not properly accounted for in the data analysis procedure. An error estimate is also included to indicate the typical accuracy presently obtainable from this self-absorption correction method. (Author)

AD-A078 797/8 PC **A03**/MF **A01**
Northeastern Univ Boston MA Electronics Research Lab
An RF Oscillator for Rocket-Borne and Balloon-Borne Quadrupole Mass Spectrometers.
Interim rept.,
Thomas A. Palasek. 10 Sep 79, 46p
SCIENTIFIC-2, AFGL-TR-79-0226
Contracts F19628-78-C-0218, F19628-76-C-0256

This thesis deals with the development of a Radio-frequency (RF) Oscillator used in rocket-borne and balloon-borne quadrupole mass spectrometers. A new toroidal-shaped RF transformer has been developed along with new control circuitry for the modified Hartly oscillator that is used. Solutions to the problems of temperature stabilization and linearity are also discussed. Also included in this

thesis is a review of quadrupole mass filter theory. (Author)

AD-A078 905/7 Not available NTIS
Purdue Univ Lafayette IN School of Mechanical Engineering
Laser Velocimetry and Particle Sizing,
H. Doyle Thompson, and Warren H. Stevenson. 1979, 577p
Proceedings of the International Workshop on Laser Velocimetry (3rd) (LV-III held at Purdue University, 11-13 July 1978.
Availability: Purdue Univ., Lafayette, IN 47907. School of Mechanical Engineering. Attn: Prof. H. D. Thompson. HC$49.50 (No copies furnished by DTIC).

Contents: A Historical Review of Laser Velocimetry. Developments in Instrumentation, Data Analysis, Combustion Measurements, Measurements in Turbulent Flows, Measurements in Internal Combustion Engines, General Applications, Particle Diagnostics, Wild Card Session, and Panel Discussion.

NUREG/CR-0967 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Multiple Property Variations in Coaxial Cylindrical Conductors Determined with Multiple-Frequency Eddy Currents,
W. E. Deeds, and C. V. Dodd. Dec 79, 60p
ORNL/NUREG/TM-335
Contract W-7405-eng-26

As many factors can influence eddy-current readings, readings must be made on a given sample at several different frequencies to determine a particular factor unambiguously. To expedite and automate the taking of readings, computer programs have been written that take simultaneous measurements of the magnitude and phase of the output voltage from an eddy-current pickup at several different frequencies on standards with known properties. Empirical formulas are then constructed from powers of various possible functions of the magnitude and phase readings, and the formulas are fitted to the desired properties of the material by a least-squares method. Finally, the empirical formulas are used with readings on unknown samples to determine their properties. Our Fortran IV computer programs are especially designed to be used with coils coaxial with multiple layers of cylindrical conductors, possibly containing defects. However, the instrument calibrating, data taking, and formula fitting parts of the programs are actually applicable to any configuration of coils and conductors. The programs for the calibration, acquisition, and reduction of data have been used to take measurements at three different frequencies on tubular samples. Up to six different properties have been obtained simultaneously and accurately for each sample.

N80-14376/1 PC **A02**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Function Anad Computation of Transducers for the Contact-Free Measurement of Distance on the Basis of the Eddy Current Effect, Part 1.
H. R. Loos. Jun 79, 22p RAE-TR-2021
Tran-Transl. Into English from Tech. Messen ATM (Germany, F.R.), V. 7/8, 1976 p 229-234.

Contact free-measurements of distance can be made using inductive transducers. These operate by changes in the impedance of a coil by magnetic and eddy current effects. A simplified model is described.

N80-14381/1 PC **A09**/MF **A01**
European Space Agency, Paris (France).
Synchronization of Clocks in the 100 Ps Range.
J. P. Moreau. Oct 79, 195p ESA-TT-578, ONERA-NT-1978-1
Tran-Transl. Into English of "Synchronisation d'Horloges dans le Domaine 100 Ps", Rept. Onera-NT-1978-1 Onera, Mar. 1978. Misc-Original Report in French Previously Announced as N79-32968.

The development of a method for measuring, with high resolution (100 ps), the differences between distant atomic clocks is presented. The synchronization operation is analyzed and the main characteristics of the set of measuring units are determined. The principle of the system is described as the transfer of the time information by an optical channel using a semiconductor laser. The various instruments including time scalas, transducers, telescopes, and chronometers are described. The results of two experiments concerning the synchronization of clocks from 6 km apart to several thousand km apart are presented. The synchronization method by laser beam achieves the expected accuracy of 100 ps when the clocks are in direct view and is better than 1 ps when they are separated by several hundred kilometers.

PAT-APPL-6-070 454 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Integrated Optical R-F Spectrum Analyzer.
Patent Application,
Harold M. Stoll. Filed 28 Aug 79, 9p AD-D006 762/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a compact lens-less spectrum analyzer where a laser impinges upon a distributed Bragg deflector via a slab-coupled optic waveguide and is bent 90 degrees. A surface acoustic wave transmitter controlled by an R-F frequency puts out a traveling strain wave which deflects the light beam according to the frequencies present; a manifold of distributed Bragg deflectors receive the deflected signal and are so arranged as to resonate at a particular frequency; the output of the resonating Bragg deflector is detected by a CCD or self-scanning diode array which produces an output indicative of the particular frequency detected. (Author)

PAT-APPL-6-076 720 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Self-Stressed Mode 1 Fracture Mechanics Test Piece.
Patent Application,
Kenneth H. B. Ashbee. Filed 19 Sep 79, 9p AD-D006 768/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Two radial cuts are made in a disc-shaped solid, the wedge (or sector) thereby produced is removed, and the exposed faces of the radial cuts are forced into contact with each other. By bonding (or welding) together the faces of the radial cuts, a self-stressed disc, capable of propagating a pure mode 1 crack is created. (Author)

PAT-APPL-6-076 893 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Digital Position Transducer Apparatus.
Patent Application,
D. W. Landau. Filed 19 Sep 79, 10p AD-D006 769/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A digital position transducer apparatus utilizing a moveable slug-tuned inductor to measure the displacement or movement of a mechanical component is described. The value of the inductor controls an oscillator's output frequency which is converted to a digital word proportional to the displacement of a mechanical component. (Author)

PAT-APPL-6-077 235 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Hole Angularity Gage.
Patent Application,
T. N. Bridges. Filed 19 Sep 79, 9p AD-D006 771/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This patent application covers a gage for measuring the angularity of the centerline of straight and/or tapered holes with respect to a flat surface. A tapered pin is inserted into the tapered hole and the gage is placed over the pin and pushed against the surface of the material with the hole in it. A dial indicator provides a direct reading of the angle that the centerline of the hole varies from being perpendicular to the surface. For straight holes, an expanding collet is first inserted into the hole and then the tapered pin is inserted into the collect causing the collet to expand against the sides of the hole and provide an accurate reading on the indicator. (Author)

PAT-APPL-6-083 829 PC **A02**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Gear Drive for Seal-Less Counter Current Chromatography.
Patent Application,
Stephen B. Leighton. Filed 11 Oct 79, 16p PB80-128283
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to centrifugal liquid processing apparatus, and, more particularly, to a coil centrifuge apparatus of the flow-through type having a variable rotation/revolution ratio and not employing rotating seals.

PB80-119720 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC.
Evaluation of a Multimegavolt Impulse Measurement System,
Robert E. Hebner, Jr., David L. Hillhouse, and Randolph A. Bullock. 15 Oct 79, 102p NBSIR-79-1933
Sponsored in part by Bonneville Power Administration, Portland, OR.

The calibration of a 4.5 MV impulse divider was evaluated by measuring both the input and output waveforms and the response of the divider to a low voltage step. The measured output was compared to an output calculated from the step response and the measured input waveform using Duhamel's Integral. The validity of the approach for this large measurement system was demonstrated for the specific waveforms studied.

PB80-120231 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Semiconductor Measurement Technology.
Interim progress rept. 1 Oct 76-31 Mar 77,
W. Murray Bullis. Nov 79, 99p NBS-SP-400-38 ARPA Order-2397
See also report dated Apr 76, PB-251 844. Sponsored in part by Defense Nuclear Agency, Washington, DC., Defense Advanced Research Project Agency, Arlington, VA., and Department of Energy, Washington, DC.

This progress report describes NBS activities directed toward the development of methods of measurement for semiconductor materials, process control, and devices. Both in-house and contract efforts are included. The emphasis is on silicon device technologies. Principal accomplishments during this reporting period included (1) refinement and extension of the analysis of the nondestructive, photovoltaic method for measuring radial resistivity variation of silicon slices; (2) development of a donor-addition technique for testing for the presence of X-levels in indium-doped silicon; (3) development of a precision, wet chemical etching procedure for use in conjunction with x-ray photoelectron spectroscopy for profiling silicon dioxide-silicon interfaces; (4) completion of thermodynamic calculations of equilibrium sodium density in oxidation atmospheres contained in polycrystalline silicon tubes; (5) initial extensions of the line-width measurement procedure to partially transparent and reflecting specimens and to submicrometer dimensions; and (6) completion of the development of a test pattern for characterizing a large-scale-integration, silicon-on-sapphire process. Also reported is other ongoing work on materials characterization by electrical and physical analysis methods, materials and procedures for wafer processing, photolithography, test patterns, and device inspection and test procedures. Supplementary data concerning staff and publications are included as appendices.

PB80-121296 Not available NTIS
National Bureau of Standards, Washington, DC.
Differential Capacitance Sensor as Position Detector for a Magnetic Suspension Densimeter.
Final rept.,

N. V. Frederick, and W. M. Haynes. Sep 79, 2p
Sponsored in part by National Aeronautics and Space Administration, Washington, DC. Prepared in cooperation with American Gas Association, Inc., Arlington, VA.
Pub. in Rev. Sci. Instrum. 50, n9 p1154-1155 Sep 79.

A differential capacitance sensor has been used in the servosystem of a magnetic suspension densimeter to detect the position of a magnetic buoy. This type of sensor has not previously been used in this application. Its design, performance, and advantages are described.

PB80-123136 Not available NTIS
National Bureau of Standards, Washington, DC.
Precise Time and Frequency.
Final rept.,
H. Hellwig. 1978, 2p
Pub. in Physics in Technology 9, p266-267 1978.

The article entitled Precise Time and Frequency, is a brief summary of the Symposium on Time and Frequency, 19th General Assembly of URSI, 1-4 August 1978, Helsinki, Finland.

PB80-123227 Not available NTIS
National Bureau of Standards, Washington, DC.
Practical Implications of Relativity for a Global Coordinate Time Scale,
Neil Ashby, and David W. Allan. 1979, 21p
Pub. in Radio Science 14, n4, p649-669, Jul/Aug 79.

Frontiers of technology now need synchronization between remote clocks to an accuracy of about a nanosecond. Rate changes arising from the velocity and gravitational potential of a transported clock used for synchronization of a network must be accounted for. In addition one cannot assume the earth is an inertial frame--i.e., not spinning. If classical Einstein synchronization were used where from the midpoint between two clocks of A and B one simultaneously sends light pulses to A and B to synchronize them, then two problems arise: first, the synchronization process will not be transitive: i.e., if A is synchronized with B, and B with C then A will not necessarily be synchronized with C. Second, starting at a point on the equator and transporting a portable clock eastward (westward), while establishing a synchronized coordinate time grid on the way will result in a discontinuity upon returning to the original points of -200 ns (200ns); minus (-) means the portable clock will be late. This paper will discuss the use of a coordinate clock network constructed on the earth's surface which does not have these problems, i.e., synchronization is transitive, and there is no discontinuity. This may be done by adjusting clocks to read coordinate time on an underlying non-rotating inertial frame. The theoretical and practical implications of setting up such a coordinate clock network using either electromagnetic signals (e.g., lasers, Loran C) or portable clocks will be discussed. It will be shown how this network may be applied in making UTC or any other global scale more useful for state-of-the-art navigation and communication systems.

PB80-123276 Not available NTIS
National Bureau of Standards, Washington, DC.
Compact Capacitor for Wide-Range Dielectric Constant Measurements on Small Amounts of Fluids.
Final rept.,
G. C. Straty, and B. A. Younglove. Oct 79, 2p
Pub. in Review of Scientific Instruments 50, n10, p1309-1310, Oct 79.

A stable parallel-plate capacitor of unusually simple design is described which is suitable for wide-range dielectric constant measurements on fluids.

PB80-125057 PC **A04**/MF **A01**
Environmental Sciences Research Lab., Research Triangle Park, NC.
Implementation of a Microcomputer-Modified Electrical Aerosol Analyzer,
Charles W. Lewis. Aug 79, 52p EPA/600/2-79/140

A commercial electrical aerosol analyzer has been modified through addition of a digital voltmeter, a microcomputer, and a printer. In unattended operation, the system can acquire a differential particle size distribution, print and plot the resulting spectrum in any of three possible representations, and repeat the cycle at preselected intervals. Details of the system assembly and instructions for its operation are given. The appendices contain a flow chart and documented listing of Program EAA, the microcomputer program which operates the system.

PB80-125180 PC **A03**/MF **A01**
Cincinnati Univ., OH. Southwestern Ohio Regional Computer Center.
User's Guide for the Gas Chromatography Automation System,
Jonathan E. Kopke. Oct 79, 45p EPA/600/4-79-067
Contract EPA-GS-05S-10458
See also PB80-100563.

This document was written as a guide for users of the Advanced GC data system ((PB80-100563). The document contains the prescribed procedures for operating the advanced GC system from a user's viewpoint. Also contained in the document is a description of the system manager's duties and responsibilities in maintaining the GC system.

PB80-132343 PC **A10**/MF **A01**
National Bureau of Standards, Washington, DC.
Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices.
Annual rept.,
Harold F. Wollin. Dec 79, 219p NBS/HB-44
Supersedes COM-71-50614. Library of Congress catalog card no. 79-600197.

This Handbook supersedes National Bureau of Standards Handbook 44, Fourth Edition, published in 1971 and includes amendments to the Handbook through 1978 that were subsequently published in the form of replacement sheets. It also includes the amendments that were adopted by the 64th National Conference on Weights during its annual meeting on July 22-27, 1979, in Portland, Oregon. This edition was developed by the Committee on Specifications and Tolerances of the National Conference on Weights and Measures, with the assistance of the Office of Weights and Measures of the National Bureau of Standards.

PB80-804057 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Fatigue Testing Machines (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Jan 80,
Peter Moore. Feb 80, 36p
Sponsored in part by National Technical Information Service, Springfield, VA.

This collection of abstracts from the international literature relates to the design, operation, and performance of fatigue testing machinery, including control systems, components, and diagnostic equipment. Application to metals, alloys, composites, and polymers under conditions varying from cryogenic to high temperature, and vacuum to greater than 1000 MPA are described. Types of fatigue investigated include those due to thermal and corrosion stresses, as well as stresses arising from fretting, flexure, and impact. (Contains 151 abstracts)

PB80-804503 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nondestructive Eddy Current Testing and Inspection (Citations from the NTIS Data Base).
Rept. for 1964-79,
William E. Reed. Feb 80, 267p
Supersedes NTIS/PS-79/0106 and NTIS/PS-78/0059. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-78/0060, and PB80-804511.

The bibliography cites reports from Government-sponsored research covering techniques, equipment, and applications. Applications include crack, flaw, and corrosion detection, fatigue determination, inspection of components, quality control, thickness measurement, and evaluation and characterization of materials. (This updated bibliography contains 262 abstracts, 30 of which are new entries to the previous edition.)

PB80-804511 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nondestructive Eddy Current Testing and Inspection. Volume 2. 1975-1979 (Citations from the Engineering Index Data Base).
Rept. for 1975-79,
William E. Reed. Feb 80, 252p
Supersedes NTIS/PS-79/0107 and NTIS/PS-78/0061. For the companion Published Search of the NTIS Data Base, see PB80-804503. See also Volume 1, 1970-1974, NTIS/PS-78/0060.

The bibliography cites reports from worldwide research covering techniques, equipment, and applications. Applications include crack, flaw, and corrosion detection, fatigue determination, inspection of components, quality control, thickness measurement, and evaluation and characterization of materials. (This updated bibliography contains 245 abstracts, 57 of which are new entries to the previous edition.)

14C. Recording Devices

AD-A078 339/9 PC **A05**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
Design and Development of the Servo System for the Back-Up Optical Recorder of the SEASAT A Project.
Technical note,
J. P. Lee. May 79, 82p Rept no. DREO-TN-79-9
Abstract in French.

This report is written on the design, analysis, simulation and final testing of the phaselocked servo system for the back-up optical film recorder. The design procedure used is the Bode method and a position resolution equivalent to 2pi/(5000 x 16) radians is desired. The analysis is carried out by both analog computer simulation and digital computer calculations. Separate control circuits are used for the reel servos and the tension motors are supplied with constant current sources. Finally the complete system was built and tested, giving a performance which met specification. (Author)

AD-A078 396/9 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
The Aerodynamics Division Airborne Data Acquisition Package MK. I.
Aerodynamics note,
A. J. Farrell. Feb 79, 50p Rept no. ARL/AERO NOTE-386

A system is described which records 32 channels of analogue data in flight in digital form. Sampling rates of 15, 30 and 60 Hertz per channel are available, with an overall capacity of 1200 samples per second. The digital word size is 12 bits. Details of the circuits, including the in-flight quick-look facility are provided. (Author)

AD-A078 818/2 MF **A01**
Kenton Engineering Corp Skokie IL
Study of Effectiveness of Rehabilitation Methods for Analog Magnetic Tape.
Quarterly rept. no. 2, 1 Oct-31 Dec 71,
Edward A. Roberts, Raymond E. Zenner, and T. Roy Thomas. 31 Dec 71, 77p Rept no. 6200-2
Contract N00014-70-C-0327
Availability: Microfiche copies only.

Two tape condition monitors have been constructed and are in the final test phase at the end of this report period. Instructions for Operation and Servicing are ready for delivery with these equipments. Preliminary measurements on three lots of tapes for test cleaning have been completed. One lot of cleaned tapes has been received at Kenton for 'after cleaning' measurements. Dropout data at various tape speeds and wavelengths are reported. (Author)

14E. Reprography

AD-A078 557/8 PC **A02**/MF **A01**
Bureau of Ships Washington DC

Operation WIGWAM. Project 3.5. Exterior Damage Photography of Submerged Targets,
J. R. R. Harter. May 55, 19p AEC-ITR-1077

Project 3.5 was established to provide visual examination of submerged objects suspended from surface buoyancy units at depths on the order of 300 feet. The underwater visual system was expected to be maneuverable in the face of relatively steady state currents on the order of 0.50 knot and capable of hovering to permit detail examination by means of an underwater television (UW-TV) equipment and provide an aiming device and platform for a 35mm underwater film camera (UW-film camera) to be furnished by Edgerton, Germeshausen and Grier, Inc. (EG and G). The completed equipment, the AN/SXQ (XN-1), was delivered and installed on shipboard 15 April 1955. After two weeks of shipboard tests, minor modifications and adjustments, the AN/SXQ was determined to be adequate for performance of the specified task. Due to the course of Operation WIGWAM events, actual performance of the Project 3.5 task was not feasible. Variations of the requisite Project 3.5 performance could have been helpful to the conduct of the operation in several instances, but due to inclement weather a considerable extension of the initially conceived equipment performance characteristics would have been necessary to accomplish these unanticipated tasks.

AD-A078 950/3 PC **A09/MF A01**
Adjutant General Center Washington Dc Administrative Management Directorate
The Army Study for User Conversion to Micropublications (IMPACT II).
Final rept. Jul 77-Jul 79,
Joseph G. Hardy, Hope L. Robinson, Edie Miley, Harold W. Jerome, and Lee Nora T. Stewart. Sep 79, 179p Rept no. AM-79-1
See also Rept. no. MP-77-1.

This study addresses the subject of converting users of Army Publications from a paper mode to a microform mode. The primary objective of the study was the design of a detailed, user oriented, implementation plan for the incremental conversion and Army-wide distribution of all applicable Department of Army publications in microfiche, using the most cost effective approach. A recommended micropublishing implementation approach is described. During the study several Army publications were created in microform, each had unique elements or characteristics which presented opportunities for publication utility improvement. Areas covered were: indexing, formatting, font and point size selection, publications automation, publication data base management, automation, and initial and demand distribution. Additionally, four microform creation processes were tested to take fullest advantage of existing micrographic state-of-the-art technology. All investigative work conducted in the course of the study and the results produced are contained in this study report. (Author)

15. MILITARY SCIENCES

15B. Chemical, Biological, and Radiological Warfare

AD-A078 844/8 PC **A13/MF A01**
Army Toxic and Hazardous Materials Agency Aberdeen Proving Ground MD
Operation of the Chemical Agent Munitions Disposal System (CAMDS) at Tooele Army Depot, Utah.
Final demilitarization plan.
Sep 78, 281p Rept no. DRXTH-IS-78050

The Tooele Army Depot CAMDS facility is intended to satisfy the following specific requirements: (1) To develop and demonstrate advanced procedures and equipment for the large-scale demilitarization of lethal chemical agents and munitions. (2) To provide a facility for the disposal of 18,800 code H M55 GB-filled rockets currently located at Tooele Army Depot. In addition, CAMDS is currently being proposed as the system for disposal of approximately 100,000 additional chemical munitions of various types in condition code H at Tooele Army Depot. This plan includes the disposal of these munitions. (3) To provide a readily available facility for disposal of limited quantities of selected unserviceable lethal chemical munitions currently located at other storage depots. The purpose of this document is to obtain the necessary approvals required by Public Laws 91-121 and 91-441, prior to initiation of toxic operations of the CAMDS at Tooele Army Depot, Tooele, Utah. The current document has been rewritten to reflect the changes in the Transportable Disposal System which resulted in the CAMDS and voids the original documentation prepared on the Transportable Disposal System.

15C. Defense

AD-A078 528/7 PC **A18/MF A01**
Center for Planning and Research Inc Palo Alto CA
Effectiveness of Civil Defense Systems.
Final rept.,
Walmer E. Strope, and John F. Devaney. Jun 79, 411p
Contract DCPA01-77-C-0223

A methodology is presented for assessing the effectiveness of civil defense program elements in reducing nuclear warfare casualties. It consists of two related models of civil defense activities: POPDEF, which assesses fatalities and injuries under nuclear attack, and PAM, which uses data and estimates of the product of specific program elements to generate most of the inputs to POPDEF. Example results are presented and the use of other measures of effectiveness is discussed. (Author)

AD-A078 742/4 PC **A02/MF A01**
Cold Regions Research and Engineering Lab Hanover NH
A Test of Snow Fortifications.
Special rept.,
Dennis R. Farrell. Oct 79, 20p Rept no. CRREL-SR-79-33

A field study was conducted to 1) more accurately define the degree of protection offered by simple snow fortifications and 2) evaluate the effort required by infantry troops to build such fortifications when only basic tools are available. A seven-man infantry squad equipped with standard issue snow shovels and an arctic sled (Akhio) constructed several simple snow structures. Construction was made more difficult by the imposition of a camouflage discipline requirement. When completed, three positions were subjected to M16A1 rifle fire while the infantry squad executed a simulated tactical assault. A fourth and much larger position was tested with simulated covering fire from an M2HB 50-caliber machine gun. None of the 5.56-mm bullets fired by the squad from ranges of 200 m to as close as 10 m managed to penetrate the 1.8-m-thick snow embankments. The 12.7-mm-diameter bullets fired from the M2HB at a range of 250 m were all stopped by 3.0 m of packed snow. The camouflage considerations and the shallow snow conditions increased the construction time for the three small emplacements by almost a factor of four, and for the larger emplacement by almost a factor of three. But the squad still handled a volume of packed snow that was equal to 3-7 times the volume of unfrozen soil that could be handled with the same amount of effort, according to field manual estimates. Under frozen soil conditions the advantages of using snow would be significantly greater. (Author)

PB80-928101 PC **E02/MF A01**
Central Intelligence Agency, Washington, DC.
Soviet and US Defense Activities, 1970-79: A Dollar Cost Comparison.
Research paper.
Jan 80, 15p SR-80-10005
Color illustrations reproduced in black and white. Paper copy available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order.

The military establishments of the USSR and the United States are difficult to compare because they differ so much in missions, structure, and characteristics. Any common denominator used for comparative sizing is imperfect, and its limitations must be understood in interpreting such comparisons. The approach taken here is to compare the defense activities of the two countries using the familiar common denominator of dollar cost. This paper presents estimates of what it would cost to produce and man in the United States a military force of the same size and with the same weapons inventory as that of the USSR and to operate that force as the Soviets do. It then compares these estimates with known US defense outlays. This approach provides a general appreciation of the relative magnitudes of the defense activities of the two countries. Dollar cost data also provide a means of aggregating elements of each country's military program into comparable categories and thus can show trends and relationships between the two defense establishments that are difficult to discern and measure in other ways.

15E. Logistics

AD-A078 457/9 PC **A02/MF A01**
Army Cold Regions Test Center Fort Greely AK
Feasibility Test (Cold Regions Phase) of Plastic Fuel Tanks for Truck Cargo: 5-Ton, 6x6, M809 Series,
James B. Storey. 17 Aug 79, 15p

During 1976/1977, 1/4-ton truck plastic fuel tanks were evaluated in conjunction with cold regions test of the M151A2, 1/4-ton truck (Product Improved) tests. A plastic fuel tank has since been designed and manufactured for use on 5-ton trucks and evaluation of these tanks under cold regions conditions has been requested by Tank-Automotive Research and Development Command (TARADCOM). The test fuel tanks are manufactured of plastic and are the standard 55-gallon capacity. The test tanks are intended to replace the steel fuel tanks on 5-ton trucks. (Author)

AD-A078 503/0 PC **A07/MF A01**
Naval Postgraduate School Monterey CA
A Comparison of Military and Civilian Air Cargo Systems.
Master's Thesis,
Roger W. Roberts. Sep 79, 140p

The military air cargo system was analyzed and compared to the growing civilian air cargo intermodal container system. Parameters such as cost, terminal handling, packaging and aircraft compatibility were examined. The research was conducted to look at the challenges faced by the Military Airlift Command (MAC) during periods of military conflict and to examine possible solutions to this dilemma through containerization. The report concludes that the 463L Materials Handling System will continue to be used by MAC in the short run, and that this may sub-optimize the military air cargo function due to its necessary interface with the civilian container community. (Author)

AD-A078 606/1 PC **A03/MF A01**
Rand Corp Santa Monica CA
Estimating the Time Required to Transition Aircraft Fleets to New Scheduled Maintenance Intervals.
Interim rept.,
I. K. Cohen, and Eugene Poggio. Oct 79, 37p
Rept no. RAND/N-1247-AF
Contract F49620-77-C-0023

Typically, decisionmakers are called upon to make decisions on aircraft inspection intervals on the basis of very limited analytic information. Under such circumstances, decisionmakers are understandably concerned about the risks incurred in extending inspection intervals. This Note presents in some detail a discussion of the phenomenon that although an immediate change is made in inspection intervals, it takes a considerable period of time for the fleet to transition to the changed interval. The slow fleet maturation may provide considerable opportunity to monitor and control the condition of the fleet during the transition period. Thus, in the case of extending inspection intervals, risk is reduced and spread over time while the payoff for the change is immediate. (Author)

AD-A078 738/2 PC **A05/MF A01**
Naval War Coll Newport RI Center for Advanced Research
Soviet Intermodal Transport.
Final rept.,

Jeffrey E. Barrie. Jun 79, 100p

Interrelations between the major Soviet freight carrying modes of transport are described in the context of the Soviet economic, political, and social systems. The evolutions of transportation development is traced, with particular emphasis on containerization. A form of decentralized planning introduced at Leningrad in 1978 is outlined. The study concludes with recommendations for U.S. economic policy toward the Soviet Union. (Author)

15F. Nuclear Warfare

AD-A078 699/6 PC **A07**/MF **A01**
Army Concepts Analysis Agency Bethesda MD
Users' Guide for the Nuclear Fire Planning and Assessment Model II and Related Routines (NUFAM II Guide).
Daniel Wu. Nov 79, 136p Rept no. CAA-D-79-4
See also AD-C000 795L and AD-C013 083.

This guide documents information pertaining to the application of the Nuclear Fire Planning and Assessment Model II (NUFAM II), as well as some of its external support routines. NUFAM II simulates two-sided tactical nuclear exchange by simulating fire planning, nuclear detonations, and damage assessments. These functions are performed based on the program logic, input data, and files provided by external support routines. At the conclusion of the simulation, the model provides information on numbers of nuclear warheads expended, personnel casualties, equipment damage, and other selected information. (Author)

15G. Operations, Strategy, and Tactics

AD-A078 411/6 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
Modeling the Effect of Information on Conflict Outcome.
Master's thesis,
Kemal Tonguc. Sep 79, 88p

The representation of certain qualitative features such as information and coordination of combat situations in the Lanchester formulations are discussed. The purpose of this thesis is to develop some simple models to describe the influence of information and coordination upon combat progress. Some graphical outcomes of these representations were obtained. (Author)

AD-A078 442/1 PC **A04**/MF **A01**
Analytical Mechanics Associates Inc Jericho NY
Preference-Ordered Discrete-Gaming Analysis of Air-to-Air Combat.
Final rept. 20 Sep 77-20 May 79,
Henry J. Kelley, and Leon Lefton. Jun 79, 67p
AFFDL-TR-79-3057
Contract F33615-77-C-3144

A preference-ordered discrete-gaming air-to-air-combat model is described. Approximately optimal switchings between several closed-loop control policies is provided by an active-cell structure in the state space, which is divided into regions of draw outcome and various types of capture. Cell buildup techniques is discussed and the results of computations for families of duels presented. A threat-reciprocity scheme for characterizing draw outcomes and tactics is discussed. A reprisal-strategy scheme for exploiting opponent's errors by extrapolation is described. (Author)

AD-A078 505/5 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
Transferability of Combat Models; Limitations Imposed by Documentation Practices.
Master's thesis,
Robert Walter Szymczak. Sep 79, 82p

This thesis proposes a hierarchy of documentation for combat models. It begins by examining criticisms and credibility of combat models to establish underlying causes and effects, and then it addresses model proliferation and ever increasing complexity as they affect one's ability to understand and transfer models. A methodology for determining whether or not a model is applicable to a specific problem is presented, as are examples of potential problem areas. Current documentation practices are examined for conditions that limit the transferability of models and contribute to the credibility problem. The above examinations have lead to a proposed three-tier hierarchy of documentation, including for the analyst documentation that is presented from the context of discovery rather than from the traditional context of justification. Recommendations are made for supplemental studies to examine related issues. (Author)

AD-A078 506/3 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
A Conceptualisation of Fire Superiority for Greater Reality and Credibility of Combat Models.
Master's Thesis,
Falk Falkenstein von Fabeck. Sep 79, 54p

Formal combat models are a means for military analysts and planners to support decisions concerning military projects. The reality, validity and credibility of combat models is still a controversial subject. This paper provides a discussion of the process of gaining fire superiority in combat. Three different input parameter categories - tactical, technical, and human parameters - were selected to serve as combat input. The combat environment transforms these inputs into combat outputs (or combat effects) in the form of operational, target and human effects. Human effects are the suppressive or psychological effects, whereas target effects are only physical effects. A conceptual model of fire superiority is developed from a theoretical definition of fire superiority. (Author)

AD-A078 654/1 PC **A04**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme CA
Multipurpose Expedient Paving System (MEPS) for Expeditionary Airfields.
Interim rept. Oct 76-Sep 77,
P. S. Springston. Apr 79, 73p Rept no. CEL-TN-1553

A Multipurpose Expedient Paving System (MEPS) is being developed to enable more rapid construction of Expeditionary Airfields (EAF's) by Marine Corps forces engaged in an amphibious landing. Previous investigations demonstrated the potential of FOMAT - a structural sandwich composed of a 20-pcf rigid polyurethane foam core with fiberglass-reinforced polyester resin (FRP) facings. FOMAT met F-4 aircraft static load, tailhook impact, and engine exhaust blast requirements. The FY-77 research effort, covered by this report, focused on pavement concepts more amenable than FOMAT to field construction. Investigations were made on alternative concepts of (1) mechanically locking prefabricated bottom facings to the core and (2) eliminating the bottom facing while adding fiberglass reinforcement to the foam. FIBERMAT (FRP bonded to a layer of fiberglass-reinforced rigid polyerethane foam) is rated as the more viable concept. FIBERMAT has been subjected to a series of laboratory tests to define response to stress fatigue and environmental cycling. Finite element techniques are utilized to design FIBERMAT pavement sections for EAF traffic areas and varying soil strenghts. Costs and benefits are projected, project technical risks are discussed, and major development milestones are outlined. (Author)

AD-A078 804/2 PC **A04**/MF **A01**
Naval War Coll Newport RI
Military Decision from the Viewpoint of Game Theory,
R. P. Beebe. May 57, 74p

It is the purpose of this paper to give a simplified explanation of what game theory is, and how it can be applied in its pure form to various military situations. We will then discuss the implications that can be drawn from the theory and show how the line of reasoning it advocates may aid in arriving at sound military decisions.

16. MISSILE TECHNOLOGY

16B. Missile Trajectories

AD-A078 861/2 PC **A11**/MF **A01**
Science Applications Inc Irvine CA
Hypersonic Interference Flow Flight Experiment Design.
Final rept. 15 Jun-15 Apr 79,
L. A. Cassel, T. C. Duncan, and E. H. Lahti. Jun 79, 243p SAI-175-80R-008, AFFDL-TR-79-3065
Contract F33615-77-C-3043

An experiment has been defined to measure the aeroheating and loads resulting from three dimensional shock wave/boundary layer interference in hypersonic flight. This report describes the definition of this flight experiment, including the instrumentation and electronics required to measure the interference heating and loads and transmit those measurements by telemetry to ground stations. The measurements include quasi-steady heat transfer rates and pressures as well as fluctuating pressures. Additional measurements are specified for specific definition of the experiment environment. The experiment is configured to investigate the interference flow at the base of a stabilizer on a missile launched from an F-4 aircraft. The missile is to be propelled to hypersonic speed by a solid propellant motor and the measurements are to be made at altitudes between 50 KFT and ground impact. The mechanical, structural, and thermal protection system specifications for the experiment carrier missile are provided in this report. Missile design and fabrication drawings are available under separate cover from the sponsoring agency.

16D. Missiles

AD-A078 611/1 PC **A06**/MF **A01**
National Aeronautics and Space Administration Langley Station VA Langley Research Center
Supersonic Stability and Control Characteristics of a Cruciform Missile Model with Delta Wings and Aft Tail Fin Controls.
Technical memo.,
William A. Corlett. Dec 79, 117p NASA-L-13149, NASA-TM-80171

An investigation has been conducted to determine the static stability and control characteristics of a cruciform missile configuration with delta wings and aft tail fin controls. The tests were conducted in the Langley Unitary Plan wind tunnel at Mach numbers from 1.60 to 4.63 through an angle-of-attack range of -4 degree to 30 degree. Model roll orientation was varied from 0 degree to 135 degree. The results indicated good longitudinal stability and control characteristics throughout the test Mach number range. Relatively high induced rolling and yawing moments were apparent at asymmetric model roll angles for the lower test Mach numbers; however, sufficient roll and yaw control was available to trim to relatively high angles of attack and lift coefficients. (Author)

AD-A078 727/5 PC **A03**/MF **A01**
Systems Consultants Inc Ridgecrest CA
Harpoon Pyrotechnic Shock Study.
Final rept. Jul 73-Jul 79,
Dan Powers, Charles E. Wright, and William N. Jones. Sep 79, 39p NWC-TP-6133
Contract N00123-76-C-0340
Prepared in cooperation with McDonnell Douglas Astronautics Co.

A study was conducted to compare predicted Harpoon missile pyrotechnic shock response with Harpoon missile design criteria. This report discusses the pyrotechnic shock environment and component failures encountered in this type of environment. Correct shock test simulation techniques and 'state-of-the-art' limitations are delineated. Actual testing techniques and test apparatus that can be used to achieve the proper test environment are discussed. Both actual test data and predicted shock levels are presented. Shock spectra environment predictions are made for several types of explosive activated devices. Test data were measured during Harpoon ejection tests and are presented as shock spectra. (Author)

AD-A078 814/1 PC **A02**/MF **A01**
M and S Computing Inc Huntsville AL
The Digital Air Defense Missile System Simulation Technical Effort.
Final rept. 14 May-30 Sep 79,
D. G. Ellenburg, M. K. Grounds, J. D. McCormick, T. G. Phillips, and E. G. Peters. 30 Sep 79, 13p Rept no. 79-057

Contract DAAK40-79-D-0003
See also AD-B038 797L.

M and S Computing, Inc., has provided engineering and programming support to develop, modify, and utilize existing Guidance and Control simulation software, and has performed studies to determine system performance in assorted operational modes. This document summarizes the accomplishment of M and S Computing, Inc., for the past five months. The remainder of this document is divided into sections described below. Section 2 describes the digital area correlator model developed by M and S Computing, Inc. Section 3 describes the system analysis support provided by M and S Computing.

17. NAVIGATION, DETECTION, COMMUNICATIONS, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A078 345/6 PC **A02**/MF **A01**
Hycor Inc Woburn MA
Design and Feasibility Demonstration of a Deployment System for a Rocket Launched Buoy,
Final rept.
6 Sep 79, 15p
Contract N00173-79-C-0094

In 1978, HYCOR submitted a proposal to the Naval Research Laboratory to design and demonstrate a technique for deployment of an electronic buoy payload from a rocket launched vehicle. In view of HYCOR's participation in the NATO Sea Gnat Program, it was proposed to use the existing Sea Gnat rocket motor, Sea Gnat fuze, and related hardware and technologies to conduct a low cost, high confidence development program. This program was successfully completed in March 1979. Live simulated and operational payloads were used in tests with an active onboard VHF transmitter providing inflight data and data on the descent and entry of the buoy into the water following deployment. The system described has been demonstrated to reliably deploy an electronic payload with dynamic loads during deployment no more severe than those experienced on water entry. The system developed is not optimized for weight or cost but is judged to be effective and reliable for its intended purpose. It is not limited to the electronic buoy for which it was developed but is applicable to any quasi cylindrical payload to be deployed following a rocket launch from the MK 36 launching system.

AD-A078 443/9 PC **A05**/MF **A01**
Purdue Univ Lafayette IN Dept of Electrical Engineering
Random Signal Flaw Detection.
Final rept. 21 Aug 75-28 Feb 79,
Vernon L. Newhouse, and Eric S. Furgason. Jun 79, 99p AFML-TR-79-4077
Contract F33615-75-C-5252

This report describes four areas of work. In the first area random signal beam forming techniques are developed which make it possible to transmit several independent beams from a phased array using the same number of incoherent noise sources. Following this ultrasound beam scanning techniques are demonstrated in which random signal correlation systems and RF correlation systems using quadrature phase techniques are used in methods for scanning the intensity profile of ultrasound transducer beams using respectively broadband signals and narrow band signals. In addition two types of deconvolution procedure are described and demonstrated which have been successful in improving the effective resolution of ultrasound correlation systems when viewing surface features. Finally the design and construction of a random signal correlation system is described which uses an electronic delay line. (Author)

AD-A078 469/4 PC **A10**/MF **A01**
Hughes Aircraft Co Fullerton CA Ground Systems Group
Adaptive Tracking System Study.
Final rept. Oct 78-Oct 79 on Phase 2,
Paul L. Feintuch, Frances A. Reed, N. J. Bershad, and Curtis M. Flynn. Oct 79, 221p Rept no. FR79-11-1127
Contract N00024-77-C-6251
See also Phase 1, AD-A063 392.

This is the final report on phase 2 of a study contract to determine the usefulness of the LMS adaptive filter in a bearing tracker structure for passive sonar. Three potential advantages of such a structure over conventional trackers motivated the study, as follows (a) While conventional trackers require a priori knowledge of the input power spectra to optimize performance, the adaptive tracker is estimating the input spectra. This suggests that the adaptive tracker may be insensitive to incorrect a priori assumptions and variations of the input spectra, (b) Since all the correlation information between the split array outputs is contained in the adaptive filter weights, the potential exists to perform broadband and narrowband tracking simultaneously, and (c) Conventional trackers are essentially designed for stationary targets, modified for use with dynamic targets with the addition of a tracking loop. However, the adaptive filter weights are adjusted iteratively (dynamically) to satisfy a minimum mean square error criteria, which may provide advantages against moving targets.

AD-A078 737/4 Not available NTIS
Defence Research Establishment Atlantic Dartmouth (Nova Scotia)
A Robust Formulation of an Optimum Cross-Spectral Beamformer for Line Arrays,
J. N. Maksym. 1 Jun 78, 12p Rept no. DREA-78/3
Summary in French.
Availability: Pub. in Jnl. of Acoustical Society of America, v65 n4 p971-975 Apr 79 (No copies furnished by DTIC).

No abstract available.

17B. Communication

AD-A078 344/9 PC **A06**/MF **A01**
Armed Forces Communications and Electronics Association Eatontown NJ Fort Monmouth Chapter
Proceedings of the Annual Seminar (4th), 'The Art of Communications Interfaces,' Technology Insertion in the C3I Arena, 14-15 November 1979.
Final rept.,
Bernard D. DeMarinis. 14 Nov 79, 154p Rept no. AFCEA-FM-4

Several papers by leading authorities on the design, application, and logistical support of Very High Speed Integrated Circuitry (VHSIC) in communications systems that are emerging in the newly developed state-of-the-art and are being fielded are presented for discussion. The impact of VHSIC on new communications equipments and systems is presented by proponents from the U.S. Army's Electronics Research and Development Command (ERADCOM), the Communications Research and Development Command (CORADCOM), and Communications Electronics Materiel Readiness Command (CERCOM). In addition, three papers from industrial proponents on VHSIC design, application, and support are given. (Author)

AD-A078 391/0 PC **A17**/MF **A01**
Burroughs Corp Paoli PA Federal and Special Systems Group
Software Maintenance Manual for the Modular System Control Development Model (MSCDM). Book 1.
Final rept. Sep 76-Nov 79.
Nov 79, 392p 66157, AD-E100 313
Contract DCA100-76-C-0083
See also Book 2, AD-A078 392.

The Distributed Master Control Program (DMCP) and the technical control application programs of the Modular System Control Development Model (MSCDM) are described. Program listings of each program and subprogram are presented. Programs are written in FORTRAN and MACRO-11 for Digital Equipment Corporation (DEC) LSI-11 microcomputers.

AD-A078 392/8 PC **A13**/MF **A01**
Burroughs Corp Paoli PA Federal and Special Systems Group
Software Maintenance Manual for the Modular System Control Development Model (MSCDM). Book 2.
Final rept. Sep 76-Nov 79.
Nov 79, 286p 66158, AD-E100 314
Contract DCA100-76-C-0083
See also Book 3, AD-A078 393.

Program descriptions and listings of the Modular System Control Development Model utility programs and diagnostics are presented. This includes the Bootstrap Load Facility for the Ring Architecture.

AD-A078 393/6 PC **A05**/MF **A01**
Burroughs Corp Paoli PA Federal and Special Systems Group
Software Maintenance Manual for the Modular System Control Development Model (MSCDM). Book 3.
Final rept. Sep 76-Nov 79.
Nov 79, 89p 66159, AD-E100 315
Contract DCA100-76-C-0083
See also Book 1, AD-A078 391.

Program flow charts for each Modular System Control Development Model (MSCDM) program is presented. Flow charts for all operating systems, application, diagnostic and utility programs are included in this single volume.

AD-A078 633/5 PC **A02**/MF **A01**
Naval Underwater Systems Center New London CT New London Lab
An Approach to Communications Modeling in the SIM II Naval Engagement Model at NUSC.
Technical document,
Lewis A. Stallworth. 16 Nov 79, 14p Rept no. NUSC-TD-6183
Presented at the Military Applications Section of the Joint National Meeting of the Operations Research Society of America and the Institute of Management Science, 15-17 Oct 79, Milwaukee, WI.

This document presents the oral version of a presentation given at the Military Application Section of the Joint National Meeting of the Operations Research Society of America and The Institute of Management Science, held in Milwaukee, Wisconsin, 15-17 October 1979. (Author)

AD-A078 817/4 MF **A01**
Bendix Corp Baltimore MD Communications Div
Sampling Digital Multiple Channel Same Frequency Repeater Study.
Final rept. Aug 78-Apr 79,
William F. Lawrence, and William F. Kruszewski. Jun 79, 69p AFAL-TR-79-1078
Contract F33615-78-C-1457
Availability: Microfiche copies only.

The feasibility of modifying an AN/ZRC-1 multiple single frequency repeater was investigated. The present design used an analog sampling scheme to allow the simultaneous repeating of up to four separate analog voice radio links, using only one frequency per link. It was found that this scheme did not lend itself to wideband digital signals such as those found with the TSEC/KY-58 voice encryption equipment. Instead, a new approach is described which would provide a sampling single frequency repeater for wideband digital signals. (Author)

AD-A078 914/9 PC **A23**/MF **A01**
Harris Corp Melbourne FL Government Communication Systems Div
DCS Synchronization Subsystem Optimization/Comparison Study.
Final rept.,
Merwin W. Williard, David Bradley, David Kimsey, and Ronald L. Mitchell. Nov 79, 533p AD-E100 318
Contract DCA100-77-C-0055
Continuation of contract DCA100-76-C-0028.

This study develops useful information for the selection, definition, and implementation of a practical synchronization capability for the future Defense Communications System (DCS). Although unique characteristics of the DCS are considered the information developed is of general use. The study evaluates the capability of a number of basic system features singly and in combinations to provide a number of desirable characteristics.

AD-A078 924/8 PC **A04**/MF **A01**
Mission Research Corp Santa Barbara CA
The Sensitivity of Satellite Communications to the Uncertainties in Selected Chemical Reaction Rate Coefficients.
Final rept. Apr 77-Feb 79,
Murray Scheibe. 31 May 79, 55p MRC-R-458, DNA-4971F, AD-E300 633
Contract DNA001-77-C-0224

The relative importance of various reaction rates are examined using the results of a recent MELT code calculation for a megaton range burst at 250 km altitude. New rate coefficients are developed for the critical reactions involved in the ion decay and the uncertainties in these rate coefficients are examined. With the use of a number of assumptions, some of them rather crude, these rate coefficient uncertainties are translated into uncertainties in communications degradation effects for HF and higher frequencies and some of these are significant. Areas in which improvement is needed, with regard to both reaction rate data and the chemistry treatment in MELT, are noted. (Author)

AD-A078 925/5 PC **A03**/MF **A01**
Boeing Aerospace Co Seattle WA
PRESTO Digital Computer Code User's Guide. Volume I. System Overview.
Final rept. 17 Jan-30 May 77.
30 May 77, 33p DNA-3898F-1, AD-E300 632
Contract DNA001-77-C-0138

PRESTO, an integrated system of computer codes, has been developed for the PREMPT program to perform EMP response analysis of communications systems. Volume One of the PRESTO User's Guide presents an overview of the entire PRESTO system and an introduction to the material contained in the other volumes (two through six) of the PRESTO User's Guide series. PRESTO provides engineering users with a tool for expeditiously analyzing electronic systems to determine electromagnetic pulse (EMP) effects. It is expected that users have a basic knowledge of digital computer usage, including FORTRAN. PRESTO consists of three groups of codes: an executive code, application codes, and a modeling library. The executive code provides the interface between the engineering user and the application programs which perform the calculations requested by the user. The modeling library contains subroutines used to model the electromagnetic response of signal cables, power systems, and ground systems. PRESTO interprets the user input, performs the required computation, and generates the output specified by the user. A modular approach is used in PRESTO to achieve maximum flexibility. The modularity of PRESTO and the independence of the executive control program facilitates the incorporation of additional application codes and modeling libraries applicable to system analyses other than for EMP effects.

AD-A078 927/1 PC **A06**/MF **A01**
Computer Sciences Corp Falls Church VA
The Defense Communications System and the Tactical Access Area: Likely Configuration of Interoperation.
Final rept. Sep 78-Sep 79,
C. Schultz, and R. Savage. Sep 79, 106p AD-E100 316
Contract DCA100-78-C-0053

This report presents likely configurations of interoperation between DCS strategic assets and tactical communications systems. In light of current efforts to define the Joint Multichannel Transmission and Switching System (JMTSS), this report is intended to promote thought, discussion, and a common approach to developing a flexible and responsive military communications network. For each configuration identified, the report addresses the feaiturs and functional services that will be provided as well as electrical interoperability. The report addresses two general classes of interoperation. First there is the situation wherein tactical networks directly access the DCS to communicate with a DCS subscriber and/or to interoperate with a DCS switched network on a functionally segregated (access area) basis, referred to as DCS-Tactical Access . The second situation is one in which DCS and tactical assets are functionally integrated to provide one 'system'. Tactical assets (switches, transmission, subsystems, user devices, etc.) will supplement, extend and reconstitute the DCS and vice versa during crisis/contingencies. The JMTSS is the current conceptual development of this situation, referred to as DCS-Tactical Integrated. The report concludes with discussion of how/where to focus design efforts to insure compatible DCS/Tactical interfaces and to achieve some degree of system integration.

N80-14291/2 PC **A19**/MF **A01**
Fondazione Ugo Bordoni, Rome (Italy).
Research on Circular Waveguide Communication Systems Ricerche Sui Sistemi di Comunicazione in Guida d'Onda Circlare.
Progress Report, 1968 - 1977.
Nov 78, 436p FUB-28
Text in Italian and English.

No abstract available.

N80-14326/6 PC **A03**/MF **A01**
Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (Germany, F.R.).
Adaptive Equalization of Delay Distorted Signals.
K. Rosenbach. Dec 78, 50p REPT-13-78
Contract BMVG-GF-78
Text in German; English Summary.

The equalization of delay distorted signals through the use of transversal filters is discussed. The advantages and disadvantages of FIR (finite impulse response) and IIR (infinite impulse response) filters are described. A combined FIR/IIR filter which contains the advantages of both filters is described. The problem of adaptive equalization of time variable transmission channels including unkown transmission signals is discussed. The necessary minimum filter length for practical applications is reported. The transient behavior of the filter parameters is computed. A comparison of the theoretical results with the measured transient behavior of an actual filter and with a computer simulated filter is presented.

PATENT-4 179 657 Not available NTIS
Department of the Air Force Washington DC
Anti-Jamming Communication System.
Patent,
Charles F. Hobbs. Filed 28 Aug 58, patented 18 Dec 79, 13p AD-D006 792/6, PAT-APPL-757 885
Supersedes PAT-APPL-757 885-58.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In the practical embodiment of the invention, several frequency channels are occupied simultaneously but for only very brief intervals of time so that only a relatively small amount of interference would be experienced on existing communication facilities. Protection against spot jamming is afforded by dodging over a wide frequency range with each of the several channels. Thus the invention provides for redundant transmission of digital information on several channels, each of which are dodging in a psuedo-random and apparently unrelated manner over a relatively large frequency-time message space. It combines the inherent reliability of time synchronization with the high information rate capability of message directed dodging over the frequency-time message space. Since there is only a small probability of two or more secondary stations being tuned to the same combination of channels at the same time, it is not necessary to transmit the address digits. They are used only to select the proper channels at the master station. In addition to making more capacity available for transmitting message digits, this feature increases the difficulty of any possible analyst since it is not known to which secondary station a given transmission is being directed.

PATENT-4 180 779 Not available NTIS
Department of the Navy Washington DC
OPSK Demodulator with Two-Step Quadrupler and/or Time-Multiplexing Quadrupling.
Patent,
William R. Hook, and Ronald P. Hilberg. Filed 21 Sep 78, patented 25 Dec 79, 8p AD-D006 788/4, PAT-APPL-944 440
Supersedes PAT-APPL-944 440-78, AD-D005 572.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A QPSK demodular apparatus utilizing a pair of doubling units in tandem but separated by a bandpass filter to remove any undesired cross products and to eliminate possible noise signal that may be applied to the second doubler is described. The use of two doubling units to provide a times 4 quadrupling allows the use of heterodyning in order to operate at a lower frequency. (Author)

PB-298 034/0 PC$14.50
International Telecommunication Union, Geneva (Switzerland). International Radio Consultative Committee.
Recommendations and Reports of the CCIR, Plenary Assembly (14th) Held at Kyoto (Japan) 1978. Volume XIII-2. Alphabetical Index of Technical Terms Appearing in Volumes I to XII.
c1978, 35p ISBN-92-61-00791-0
See also PB-298 021.
Also available in set of 14 reports PC$850.00, PB80-133267.

The volume is an alphabetical index of technical terms appearing in Volumes I to XII of the Recommendations and Reports of the XIVth Plenary Assembly of the CCIR, Kyoto 1978. It also covers those CCIR Reports which are published separately, but does not cover CCIR special publications.

PB80-119316 PC **A03**/MF **A01**
National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunication Sciences,
Measurements of an FM Receiver in FM Interference,
John R. Juroshek. Oct 79, 40p NTIA-REPORT-79/27

This report investigates the performance of an FM, landmobile, receiver in FM interference. Measurements are described showing the effects of multiple interfering FM signals as a function of modulation index, signal-to-interference ratio, signal-to-noise ratio, and frequency offset between the victim and interferer. The performance of the receiver is measured with various combinations of one to three interfering FM signals. The report also describes the spectra of the audio output during various interference conditions.

PB80-119605 PC **A11**/MF **A01**
Federal Communications Commission, Washington, DC.
Final Report of the Advisory Committee on Cable Signal Leakage.
1 Nov 79, 247p

The Advisory Committee was asked by the F.C.C. to help determine the relationship between cable television system signal leakage, as measured at ground level, and the probability of harmful interference to aeronautical and other radio services. The Committee advised staff of the Commission and ogther federal agencies in their research directed toward this question. The Report if a detailed review of that research and analysis. The Report concludes that it is possible, on the basis of ground-based measurements, to determine whether leakage fields in the airspace will be sufficient to cause interference. A regulatory scheme to prevent such interference is suggested.

PB80-124262 PC **A07**/MF **A01**
Federal Communications Commission, Washington, DC. Rules Div.
Land Mobile Spectrum Utilization: Los Angeles, California, and San Diego, California.
Final rept.,
Larry D. Reed. Nov 79, 141p FCC/PRB/RDL-79/02
See also PB-284 523.

This report describes radio frequency utilization by FCC licensees in Southern California. These licensees include among others: police and fire departments, hospitals, public utilities, commercial, marine and common carrier users. The report analyzes a large amount of monitoring data taken from February 14, 1979, to March 6, 1979. The nature of the monitoring and data analyses are described.

The extent of frequency utilization is described in terms of four 'occupancy categories' (zero, low, substantial and very high). The rationale for these categories and their relationship to measured usage data are given. Summary tables enable direct comparison of the use by the various individual radio services, e.g., police, business, taxicab, etc. Separate analyses are given for utilization by each of the land mobile services and frequency bands. The report also includes frequency distributions by occupancy and identifies the channels with zero and very high occupancy. Channel usage between 25 and 855 MHz is described.

PB80-125321 CP **T99**
Federal Communications Commission, Washington, DC. Data Automation Div.
Marine (Telephone) Radio Station License Data Base.
Data file,
Nancy Alford, and William C. Bushman. Dec 79, mag tape FCC/DF-80/001
Supersedes rept. no. FCC/DF-78/016, PB-288 257.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The tape contains data for applicants and licensees operating under the Marine Radio Service, and the primary information is obtained from FCC Form 501 'Application for Ship Radio Station License' and FCC Form 502 'Application for Ship Radiotelephone and/or Radionavigation Station License'. Data records include station and license identification, mailing address (all items do not contain Zip code), radiofrequency, issue and expiration dates, and various codes. The Marine (Telephone) Radio Service data base is recorded in EBCDIC IBM on 1600 BPI, 9-track, odd parity tape. All data blocks are 1920 characters in length. (The first six characters of each block are for block identification and control. The first six characters of record are for record identification and control.) The data base contains approximately 456,306 records of 604 data characters, with 3 records in each block.

PB80-127475 PC **A05/MF A01**
Middleton (David), New York.
Performance of Telecommunications Systems in the Spectral-Use Environment. Part V: Land-Mobile and Similar Scenarios in Class A Interference.
Contractor's rept.,
David Middleton. Jun 79, 91p
Contract HO-A01-78-00-1158

A canonical model of receiver performance in general Class A interference environments is constructed. The measure of performance employed is the Probability of Noninterference Criterion (PNIC), quantitatively expressed by the probability P(a), Eq, (2.2), and evaluated for Class A noise, with a desired signal (to desired receiver) propagating according to a r to the minus 2 gamma power law, where the signal source (or reciprocally, the intended receiver) performs a random walk vis-a-vis the receiver (or source). Analytical and numerical evaluation of the PNIC is carried out as a function of an appropriately defined input signal-to-receiver noise ratio, for various ranges of parameter values, describing different nongaussian noise fields, random walks with different variances, signal sources with different propagation laws. The relationship of the PNIC to the more general criteria of performance (error probabilities, etc.), is also discussed. Detailed quantitative results, and examples, are obtained and discussed, which illustrate how this canonical model (for all Class A interference) can be employed, not only for land-mobile telecommunication scenarios, but for other situations involving Class A noise and various random walk models.

PB80-129299 PC **A11/MF A01**
Federal Communications Commission, Washington, DC. Policy Development Div.
Spectrum Requirements for Civil Maritime and Aeronautical Services, Executive Overview. Volume I,
Raymond M. Wilmotte, and Philip L. Rice. Nov 78, 232p FCC/PRB/PD-79-04

The leverage of the civil maritime and aeronautical Services on the U.S. economy and their importance to its security justify measures significantly disproportionate to the size of the Services and their supporting industries. Both services operate worldwide, are internationally very visible, and must conform with international allocations and assignments. It seems clear that retaining the present U.S. bandwidth of 1.4 MHz for all civil maritime mobile services could stultify any attempt to meet even present needs. Accordingly, the UHF Task Force chose to compare in detail for this Service the potential of two alternative domestic allocations, 6.4 MHz and 11.8 MHz. It appears that the greater incentives provided by the efficient procedures and technology required for the smaller allocation would probably lead, by the end of this century and immediately after, to better service diversity and quality, correspondingly higher demand, and more flexibility to take care of unexpected surges in demand than the larger allocation of 11.8 MHz. To reveal the detailed structure of Service needs and development options, the report analyzes in depth specific time-saving and spectrum-saving procedures and technology for individual subservices, message types and functions, and radio system configurations.

PB80-137359 PC **A03/MF A01**
National Oceanic and Atmospheric Administration, Washington, DC. Environmental Data and Information Service.
A User's Guide to the Conference Manager Subsystem of EDIS CONFER, The Environmental Data and Information Service Computer Conference System,
Darrel R. Knoll, and R. Scott Jennings. Feb 79, 28p NOAA-TM-EDIS-SAC-2, NOAA-79121203

Computer conferencing is a recently developed management tool that offers potentially significant improvement in communications for decentralized organizations and groups of individuals or even those who simply need a convenient, informal record of their discussions. In less than 2 years, it has benefited the Environmental Data and Information Service (EDIS) through the development of EDIS CONFER. This conference manager's guide discusses how to obtain CONFER, how to create and manage a computer conference, and how to maintain the files used by CONFER.

PB80-803059 PC **N01/MF N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Satellite Television Transmission (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Nov 79,
Gerald F. Zollars. Dec 79, 197p
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography cites articles from the international literature. Topics include domestic satellite television systems, satellite networks, satellite transmission, space law, ground stations, satellite design, and problems of international law, and cooperation created by satellite television transmission. This bibliography excludes articles cited in the Published Searches titled Communications Satellite Technology. (Contains 190 citations)

PB80-803893 PC **N01/MF N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Communication Satellite Technology. Volume 4. 1979 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1979,
Gerald F. Zollars. Jan 80, 66p
See also Volume 1, 1976, NTIS/PS-79/0332; Volume 2, 1977, NTIS/PS-79/0333; and Volume 3, 1978, NTIS/PS-79/0334.

The cited articles from the international literature concern all aspects of communication satellite technology. Included are articles on Satellite Networks, data transmission efficiency, time division multiple access, data links, and phase shift keying. (Contains 239 citations)

PB80-804545 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Frequency Allocation and Management. Volume 2. 1977-January, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-Jan 80,
William E. Reed. Feb 80, 84p
Supersedes NTIS/PS-79/0044, NTIS/PS-78/0076 and NTIS/PS-77/0065. See also Volume 1, 1964-1977, NTIS/PS-79/0043.

Reports are cited which cover spectrum utilization and frequency assignment techniques. Frequency management planning and regulations and electromagnetic compatibility are included. (This updated bibliography contains 77 abstracts, 35 of which are new entries to the previous edition.)

PB80-923900 Standing Order
Federal Communications Commission, Washington, DC. Cable Television Bureau.
Aeronautical Frequency Assignments Near Cable Television Carrier Frequencies.
Quarterly repts.
1980, 4 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $12.50/each issue; all others write for quote. Single copies also available in paper or microfiche.

The report contains lists and geographical locations of aeronautical radio stations operating near frequencies commonly used for visual, aural, or pilot carriers by cable television systems. These lists are provided to assist cable television system operators in determining whether they must adjust their frequencies or take other action to comply with FCC rules (Section 76.610 and 76.611) prohibiting cable use of certain frequencies in case of conflict with aeronautical radio use of those frequencies.

17C. Direction Finding

AD-A078 373/8 PC **A11/MF A01**
Rand Corp Santa Monica CA
Transient Response of a Heterodyne Receiver: Implications for a Time-of-Arrival System.
Interim rept.,
Thomas Finley Burke. Nov 79, 227p Rept no. RAND/R-2418-AF
Contract F49620-77-C-0023

A directional antenna is a filter whose response varies with direction. A modulated signal transmitted from such an antenna produces different far-field waveforms in all directions (except for possible symmetry). The response of a receiver to the transmission will vary with position in the antenna pattern of the emitter. This effect is ordinarily negligible but it could limit the ultimate performance of any system that accepts off-axis signals and relies upon the details of waveform. In a leading-edge TOA system used to determine the location of a pulsed emitter, the several receivers necessarily lie at different angular positions from the emitter. This analysis indicates that in a simple, idealized TOA system that would otherwise be entirely free from error, the waveform effect arising from a directional emitter can lead to errors of several dozen meters in the computed location. (Author)

17E. Infrared and Ultraviolet Detection

AD-A078 323/3 PC **A02/MF A01**
Defence Research Establishment Valcartier (Quebec)
Pulsed TEA-CO2 Laser Radar with Heterodyne Detection.
Rept. for Jan 76-Nov 77,
J. M. Cruickshank. Aug 78, 20p Rept no. DREV-R-4116/78
Abstract in French.

Ranging has been demonstrated with an experimental laser rangefinder employing a hybrid TEA-CO2 laser transmitter and heterodyne-detection receiver. A description of the system, including its operating principles and performance characteristics, is presented. Ranging results are given to 5 km on targets with previously measured characteristics and to 32 km on natural targets. The application of TEA-CO2 laser transmitters in optical radar systems capable of detecting and tracking high speed targets is briefly discussed. (Author)

AD-A078 371/2 PC **A03/MF A01**
Morgan Semiconductor Inc Garland TX
Ge-Si Supersonic FLIR Window.
Final technical rept. 1 Jul 78-31 Mar 79,
A. R. Hilton. Jul 79, 49p AFML-TR-79-4085
Contract F33615-78-C-5105

The purpose of the program was to evaluate the infrared optical properties and related physical properties of melt formed Germanium-Silicon alloys as potential supersonic FLIR window materials. The approach was to combine the infrared transparency of germanium with the excellent physical properties of silicon to produce a window material capable of withstanding the temperature excursions and rain drop impact occuring during supersonic flight. Attention was confined to alloys with silicon content below 50 atom % to avoid the intrinsic lattice absorption that occurs at 9 micrometers in the infrared for silicon or silicon rich alloys. A zone levelling technique was selected and modified in a manner expected to yield materials free of oxide absorption. A melt form method was selected rather than vapor phase because of the potential problems in scaling up to produce large FLIR windows. Unfortunately, the growth of alloy compositions with silicon content above 5% proved to be impossible to do at least under the operating conditions and with the equipment used. Major problems were long term temperature stability, zoning rates and reactivity of the molten alloys with quartz boats and ampoules. Although the concentration range up to 50 atom % silicon was covered, infrared transmission was not obtained for any compositions with silicon content above 5 atom%. Rain erosion samples were submitted for evaluation covering five compositions. Discussions related to the best Ge-Si alloy composition for FLIR applications are presented along with a projection of the related physical-optical parameters expected for that composition.

AD-A078 436/3 PC **A11/MF A01**
General Electric Co Cincinnati OH Aircraft Engine Group
Advanced Infrared Signature Prediction Program. Spectral Calculation of Radiation from a Turbine Propulsion System as Intercepted by an Observer (SCORPIO-N). Volume III. Analysis.
M. E. Wilton. Nov 79, 245p Rept no. R78AEG314
Contract N00140-76-C-1072
See also report dated Dec 77, AD-C012 462L.

Current infrared-guided missiles can detect and destroy aircraft from relatively long distances. Future IR missiles will be even more sensitive and destructive. The engine designer must select cycles and engine configurations that present as small a target as possible to these missile threats. To accomplish this, he must know the IR emissions from the aircraft and be able to judge the success of schemes to suppress these emissions. Measurements are invaluable in determining the IR emissions for selected aircraft situations but cannot possibly be made for all aircraft and for all situations. This is obviously true in the engine design phase. In addition, understanding of the fundamental sources of these emissions is essential to the invention or evaluation of new suppression concepts. An accurate prediction pool, therefore, is vital to the process of reducing the vulnerability of an aircraft to IR-guided missiles. As a supplier of jet engines for military aircraft, the General Electric Company has developed a series of computer programs to predict the IR signatures and vulnerability of IR-guided missiles. The SCORPIO-N computer program presented in this report is the latest in the series. It is an outgrowth of the SCORPIO-IIIA program (Reference 1) and the SPRITE program (Reference 2) with improvements to the plume module which permit studies of truly three-dimensional flow fields. (Author)

AD-A078 794/5 PC **A05/MF A01**
Naval Surface Weapons Center White Oak Lab Silver Spring MD
A Method of Computing Ship Contrast Temperatures Including Results Based on Weather Ship J Environment Data,
Donald M. Wilson. 29 Jan 79, 99p Rept no. NSWC/WOL-TR-78-187

This report describes a new method of calculating ship contrast temperatures and presents calculations using this method with weather ship data. The new method, named the Single Element Method, treats the ship as a single vertical element and applies 3 correction factors in defining an average ship temperature. These account for the different internal temperature and construction of various sections of the ship and also for the presence of hot exhaust stacks. A computer program based on the Single Element Method is described and ship contrast temperature calculations are given. This program models a specific ship, the U.S. Navy Patrol Frigate. However, the choice of ship model is shown to be not critical provided that stack cooling is assumed. The program was run with weather data gathered by Weather Ship J over an 8 year period (1964-71). Results are given as the probability of observing effect of target ship heading and season on contrast temperatures is analyzed and discussed. A general recommendation of expected contrast temperatures is made for the weather data of this study. (Author)

17G. Navigation and Guidance

AD-A078 517/0 PC **A05/MF A01**
Analytic Sciences Corp Reading MA
Differential Omega in the Alaska/Yukon Region: An Analytic Assessment.
Final rept. Oct 78-Jul 79,
James M. Foltz, Barry E. Griffiths, Richard D. Healy, and Radha R. Gupta. Aug 79, 94p TASC-TR-1579-1, FAA-RD-79-77
Contract DOT-FA78WA-4236

This report presents an analytic evaluation of the differential Omega experiment being conducted by the Federal Aviation Administration in the Alaska/Yukon region. An error model for Omega propagation prediction residuals is used to predict performance achievable with an equipment suite consisting of a TRACOR 599R Omega monitor receiver and associated ground station equipment built by Transport Canada, and an airborne suite which includes a modified TRACOR 7620 Omega navigation set and special-purpose differential Omega equipment built by Systems Control, Inc. (Vt.). Predictions are made for use of the equipment as a non-precision approach aid within the differential Omega coverage area and for use as an enroute navigation aid between areas serviced by a differential Omega ground station. (Author)

AD-A078 607/9 PC **A08/MF A01**
Intermetrics Inc Cambridge MA
GPS and EAR/GEANS Software Support.
Final rept. Dec 76-Jun 79,
N. A. Carlson, W. S. Widnall, P. K. Sinha, P. A. Grundy, and L. F. Wiederholt. Aug 79, 166p IR-397, AFAL-TR-79-1127
Contract F33615-77-C-1044

The Air Force Avionics Laboratory is sponsoring development of both the Generalized Development Model (GDM) of GPS User equipment, and the EAR/GEANS radar/inertial navigator. This report documents results of analysis and software support for both of these programs. GPS-related analysis has been performed in the area of GDM software support, particularly, stability analysis of alternate designs for rate-aiding of non-coherent mode of GPS receiver; vertical channel analysis and simulation; improved GPS/Inertial Simulator model implementation; and integrated GPS/strapdown performance studies. EAR/GEANS-related analysis has been performed in the areas of Error Isolation Filter (EIF) development planning; vertical channel error modeling; error modeling for GEANS space-stable baro-inertial navigator; EAR radar measurement modeling; EAR/GEANS flight test data recording; gravity perturbation modeling; EAR/GEANS Error Isolation Filter synthesis; onboard feedback correction compensation in the EIF; and EIF optimal filter/smoother mechanization equations selection. (Author)

AD-A078 614/5 PC **A03/MF A01**
National Aeronautics and Space Administration Langley Station VA Langley Research Center
Experimental Determination of Position-Estimate Accuracy Using Back-Azimuth Signals from a Microwave Landing System.
Technical paper,
Charles E. Knox. Dec 79, 37p NASA-L-13074, NASA-TP-1574

This paper presents the results of flight tests using the NASA Terminal Configured Vehicle (TCV) Boeing 737 airplane to obtain position estimates with back-azimuth signals from a microwave landing system. The most accurate position estimates were obtained from a combination of back-azimuth and distance-measuring-equipment (DME) signals. Less accurate position estimates were obtained with back-azimuth signals alone; the least accurate position estimates were obtained with dual DME signals. (Author)

AD-A078 808/3 PC **A13/MF A01**
Raytheon Co Bedford MA Missile Systems Div
Modular Digital Missile Guidance.
Technical rept. 1 Jan-31 Dec 77 on Phase 4,
Frank J. Langley, A. J. Mannion, K. D. Laube, J. Demetrick, and D. S. Goldstein. 14 Dec 79, 286p BR-11344, ONR-CR233-052-4
Contract N00014-75-C-0549
See also Phase 5, AD-A072 544.

A set of macromodular microcomputer specifications has been prepared to meet a wide range of missile guidance and control requirements. These specifications define the function performance and interface requirements of each microcomputer module i.e. microprocessor, memory and input-output I/O interface for analog and serial digital I/O, such that device technology improvements can continually be accommodated within the bounds of module function performance and interface requirements. To ensure such flexibility in design, other alternative device technologies were reviewed and evaluated for the MIL-STD-4553A serial digital I/O interface and the spectrum analyzer module, viz: fiber-optic data link and charge-coupled device, (CCD), very-large-scale integration (VLSI) analyzer options. In addition the requirements for universal microcomputer development systems were explored in order to support both medium-speed single-chip microprocessors and high-speed bit-slice emulators to preserve software commonality. Lastly, the compatibility of the Navy AN/UYK-30 microprocessor with the macromodular microcomputer family was investigated on the basis of throughput and electrical interface. In summary, this phase of the program has culminated in the generation of a practical set of microcomputer module specifications for multi-source procurement. (Author)

AD-A078 809/1 PC **A09/MF A01**
Virginia Univ Charlottesville Research Labs for the Engineering Sciences
Discrete Analog Processing for Tracking and Guidance Control.
Final rept. 1 Aug 78-31 Aug 79,
E. S. McVey, E. A. Parrish, R. M. Inigo, and R. J. Schalkoff. 31 Aug 79, 181p UVA/525350/EE79/102, ONR-CR233-092-1
Contract N00014-78-C-0695

The search for and development of algorithms for a real-time, automatic system capable of tracking 2-D targets in complex scenes is discussed. The problems and constraints involved in such an undertaking as well as previous efforts are summarized. No algorithms could be found in the literature that will provide satisfactory results for realistic conditions. A mathematical model of scene spatial and temporal evolution is developed for certain classes of targets and target perturbations. It is shown that for small target perturbations the 2-D tracking problem may be approximated as a 1-D time-varying parameter estimation problem. A novel and CCD-implementable solution is developed which is superior to previously developed algorithms, particularly when considering target rotation and dilation and target/background separation. Results of system simulation and suggestions for future research are presented. (Author)

AD-A078 846/3 PC **A03/MF A01**
Federal Aviation Administration Washington DC Systems Research and Development Service
Field Impact Evaluation Process on Electronic Tabular Display Subsystem (ETABS).
Final rept. Dec 78-Jul 79.
Oct 79, 33p Rept no. FAA-RD-79-100

This report describes the process used in conducting a field impact evaluation of the Electronic Tabular Display Subsystem (ETABS). Various group structural and process techniques are described.

These include a diagonal slice approach to team formulation and several different methods of team building, process control and conflict management. (Author)

AD-A078 848/9 PC **A04/MF A01**
Federal Aviation Administration Washington DC Systems Research and Development Service
Field Impact Evaluation Report on the Electronic Tabular Display Subsystem (ETABS). The Electronic Tabular Display Subsystem Field Impact Evaluation Team.
Final rept. Dec 78-Jul 79.
Oct 79, 54p Rept no. FAA/RD-79-101

A team of field personnel from air traffic and airways facilities conducted an impact assessment of the projected implementation of the Electronic Tabular Display Subsystem (ETABS) at air route traffic control centers. They further developed alternatives which could be expected to reduce or eliminate the negative consequences identified which could result from ETABS implementation. Six impact areas are addressed. These are: 1. Impact on the workforce. 2. Technological considerations. 3. Implementation. 4. Operations. 5. Training. 6. Logistics support. Conclusions and recommendations as to the most desirable alternative solutions from a field viewpoint are presented. (Author)

N80-14065/0 PC **A21/MF A01**
Fondazione Ugo Bordoni Rome (Italy).
On Radar in Air Traffic Control Ii Radar Nel Controllo Del Traffico Aereo.
Final Report.
Jul 79, 485p FUB-11-1979
Conf-Proc. Of Lectures at Cnr Aiuti Alla Navagazione E Controllo Del Traffic Aereo, Rome 3-5 Jul. 1979. Text in Italian; English Summary.

No abstract available.

PAT-APPL-972 252 PC **A03/MF A01**
National Aeronautics and Space Administration. Pasadena Office, CA.
Optical Gyroscope System.
Patent Application,
W. C. Goss, and R. Goldstein. Filed 22 Dec 78, 35p N80-12383/9, NASA-CASE-NPO-14258-1
Subm-Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An optical gyroscope is disclosed which has high accuracy at both slow and fast rotation rates. The gyroscope operates alternately in two modes, one mode utilizing an added 90 deg phase shift and the other employing no added phase shift, to provide high sensitivity for a wide range of rotation rates. A novel beam splitter is used which first lets the beam pass through, and is later energized to cause the returned beam to be reflected. Linear polarization of the light beam is maintained by keeping all fiber portions in curvature.

17H. Optical Detection

AD-A078 359/7 PC **A02/MF A01**
State Univ of New York At Buffalo Amherst Medical Image Processing Group
Laser Electro-Optic System for Three-Dimensional Topographic Mensuration,
Bruce R. Altschuler, J. Taboada, and Martin D. Altschuler. 1979, 8p SAM-TR-79-302
ARPA Order-3639, Grant PHS-GM-381
Pub. in Proceedings of the Society of Photo-Optical Instrumentation Engineers, v182 p192-196 1979. Sponsored in part by Grants: PHS-GM-381, PHS-HL-4664, PHS-RR-7, PHS-NCI-CB-84235 and PHS-HL-18968.

No abstract available.

AD-A078 678/0 PC **A07/MF A01**
Wisconsin Univ-Madison
Remote Measurements of Boundary Layer Velocity Parameters by Monostatic Lidar.
Technical rept.,
Jeffery Thomas Sroga. Oct 79, 132p
ERADCOM/ASL-CR-79-0136-1
Contract DAAG29-76-C-0136

Wind velocity parameters in the planetary boundary layer are measured using spatial inhomogeneities in the natural aerosol content as tracers. Lidar measurements of these spatial inhomogeneities are correlated in time and space to remotely estimate the mean speed, direction and the rms speed variance of the wind velocity. Aerosol inhomogeneities with horizontal dimensions of 60m-0.1km were found to be efficient tracers of the wind. The coherence between spatially and temporally separated lidar profiles of these spatial aerosol inhomogeneities is used to determine the perpendicular components along and across the beam pattern of the horizontal wind velocity. Comparisons between lidar horizontal wind measurements with tower anemometers and pilot balloons show that lidar can remotely sense the boundary layer flow.

PAT-APPL-6-068 817 PC **A02/MF A01**
Department of the Air Force Washington DC
Aimpoint Selection Processor.
Patent Application,
J. G. Romanski. Filed 22 Aug 79, 23p AD-D006 758/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The selection and designation of an aimpoint on a known type of target appearing in the field of view of a video tracking system imaging sensor is accomplished by developing binary target patterns from quantized sensor data generated inthe video tracking system video preprocessor; measuring the moments of the target patterns; developing and storing a target reference pattern data base; computing from real time binary coding and moment measurement data and from the stored target reference pattern data base an ensemble of estimated aimpoints; testing the validity of the estimated aimpoints; and averaging valid estimated aimpoints to provide an output aimpoint signal. Mechanization of the invention comprehends the use of video tracking system functions to provide quantized binary coded target patterns and the use of dedicated accumulators to generate pattern moment measurements. A microprocesor computes and stores the target pattern reference data base and performs the aimpoint selection algorithm. (Author)

17I. Radar Detection

AD-A078 328/2 PC **A07/MF A01**
Ohio State Univ Columbus Electroscience Lab
Improved Identification of Underground Targets Using Video-Pulse Radars by Elimination of Undesired Natural Resonances.
Master's thesis,
Ioannis Leonidas Volakis. Oct 79, 138p Rept no. ESL-710816-4
Contract N00014-78-C-0049

A process for identifying and determining the structure, depth and relative position of an underground tunnel from its backscattered response is presented. Application to theoretical and measured tunnel echoes is included with very satisfactory results. Basically, the process involves the isolation of a clutter free tunnel response by effectively removing all undesired poles and clutter or noise from the original (unprocessed) echo. The results can be evaluated by Grey-Level Mapping a traverse of responses over the tunnel. The employed signal-processing techniques are very general and can be used for detection of other subsurface targets. (Author)

AD-A078 471/0 PC **A05/MF A01**
Mathematical Applications Group Inc Elmsford NY
The RADOT Code System to Calculate the Radar Return from a Forested Area.
Final rept.,
M. O. Cohen, and E. S. Troubetzkoy. Oct 79, 91p MAGI-7065, ETL-0206
Contract DAAK70-78-C-0158

RADOT (Radar on Trees) is a system of FORTRAN computer codes designed to predict the radar return from a canopy of vegetation. The system combines a realistic simulation of the geometry of the trees of a forest with simple approximations as to the physics of radar scattering with individual branches and leaves. Program TREE is used to generate a prototype tree, for example, an oak tree. A tree run is based upon a detailed input description and need be performed only once for each tree type. The output is a tree model, described down to the level of individual branches and leaves, which can be combined with a 'library' of previously generated prototype trees, into a new library of prototypes. This new library subsequently serves as input to Program HIT, the main geometry code. Program FORGEN, the forest generator, combines user input with built-in distribution functions to place trees throughout a simulated forest area. The tree, itself, is one of the prototypes available from the library, scaled and reoriented by FORGEN. The output of FORGEN is a forest model which contains information as to the location, size, orientation and tree type of each tree in the forest. This forest model can be saved for all subsequent analyses involving this forest.

AD-A078 478/5 PC **A06/MF A01**
Gilfillan Van Nuys CA
Signal Processing for Unattended Radar.
Final Technical rept. Sep 78-Feb 79,
John M. Milan, Robert H. Fletcher, Jr., Charles D. Lucas, Jr., and Jack W. Goodwin. Oct 79, 174p
RADC-TR-79-243
Contract F30602-78-C-0268

This final report documents the results of a six-month study conducted during Phase 1 of a contract to examine Signal Processing for Unattended Radars. Based on a general set of system and processor requirements for a representative unattended radar, various signal processing operations, architectures, and technologies are evaluated. A recommended signal processor is identified, and the selection rationale is presented. The principle selection criteria are those of reliability, performance, cost, maintainability, risk and power consumption. The major risk areas in the selected processor have been identified and a validation plan pro=posed for Phase II of the Spur effort. This plan consists of recommended approaches, including a formal test plan, for reducing these risks. (Author)

AD-A078 518/8 PC **A04/MF A01**
National Oceanic and Atmospheric Administration Boulder CO Wave Propagation Lab
Simulation of Radar-Measured Doppler Velocity Profiles in Low-Level Wind Shear. Phase I.
Final rept. Jan-Aug 77,
W. B. Sweezy, W. R. Moninger, and R. G. Strauch. Feb 78, 53p FAA-RD-78-46
Contract DOT-FA75WAI-622

A computer simulation of radar-measured radial velocity profiles was made to evaluate the effects of finite antenna beamwidth and the location of the radar on the measurement of low-level wind shear. The inputs to the computer simulation program are the radar characteristics and the existing wind field - the outputs are the wind component along any line (usually the glide path) and the radar-measured radial velocity profile for a given antenna location and antenna pointing. The results show that a radar beamwidth of 1.5 deg. provides sufficient spatial resolution to measure low-level wind profiles. However, when the wind fields contain horizontal gradients, headwinds and tailwinds encountered by an aircraft on the glide path cannot be measured by a fixed-beam radar that is offset from the end of the runway. A steerable antenna is needed to adequately measure the wind profile for these cases. (Author)

AD-A078 657/4 PC **A04/MF A01**
Dallas Seismological Observatory TX
Crustal Studies of the Nevada Test Site: Interpretation of SMU Line E-3.
Final rept.,
Eugene Herrin, Tom Goforth, and John Ferguson. Jul 79, 54p AFOSR-TR-79-1309
Contract F49620-77-C-0126, ARPA Order-3291

During January 1978 a seismic reflection survey was conducted at Yucca Flat on the Nevada Test Site. A total of 25 line miles was surveyed, including two east-west profiles perpendicular to the trend of the valley and one north-south profile parallel to the trend. Four Y-900 LF vibrators were used to generate signals. Because of the expected high attenuative characteristics of the dry alluvium in Yucca Flat, 4.5 Hz geophones and low-frequen-

cy sweeps were employed. A structural cross-section which is consistent with gravity and borehole data is presented for the southern portion of Yucca Flat. (Author)

AD-A078 734/1 PC **A03**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Millstone Signal Processing.
Project rept.,
Robert A. Ford. 20 Sep 79, 32p STK-104, ESD-TR-79-230
Contract F19628-78-C-0002

This report describes the new signal processing portions of the Millstone radar. Included is the waveform design for deep space search and tracking functions and the implementation and integration of these functions into the existing radar. A computer controlled digital waveform generator and a programmable array processor are the two important pieces of hardware required in the upgrade. (Author)

PAT-APPL-6-073 479 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Impulse Generator Apparatus.
Patent Application,
M. M. Driscoll. Filed 7 Sep 79, 13p AD-D006 765/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An impulse generator apparatus for a high resolution Chirp radar utilizing a fast settling time VHF oscillator in combination with a digital counter and a low phase distortion output filter to provide a sharp gated sinusoid impulse waveform to excite the receiver dispersive delay line. The present apparatus relates broadly to a transmit pulse generator, and in particular to an impulse generator apparatus for a Chirp radar unit. The pulse generator is an electronic circuit which is capable of producing a waveform that rises abruptly, maintains a relatively flat top for a predetermined interval, and then abruptly falls to zero. Various circuits, such as the relaxation oscillator, have been utilized to generate a rectangular waveform having an extremely short duration, and as such as referred to as pulse generators. However, there is a class of circuits whose exclusive function is generating short-duration, rectangular waveforms and these circuits are usually specifically identified as pulse generators.

PATENT-4 177 437 Not available NTIS
Department of the Air Force Washington DC
High Power Pre-TR Switch.
Patent,
James F. McLaughlin, and Harry Goldie. Filed 20 Jan 78, patented 4 Dec 79, 3p AD-D006 800/7, PAT-APPL-871 066
Supersedes PAT-APPL-871 066-78, AD-D004 681.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A higher power TR switch is provided. The TR includes a vial housing a halogen gas such as chlorine. The vial is comprised of hot pressed boron nitride which eliminates the associated thermal problem and also the gas cleanup problem.

18. NUCLEAR SCIENCES AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

N80-14913/1 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Enhancement of D-T Reaction Rate Due to D-T Contact.
S. Hitoki, M. Ogasawara, and O. Aono. Sep 79, 29p IPPJ-419

The reaction rate that is appropriate for magnetized nonuniform plasma is numerically calculated to investigate the enhancement of the D-T reaction rate. Spatial separation of the guiding center distributions of D and T which enhances the reaction rate is discussed. Cases of several guiding center configurations are investigated. The largest enhancement is obtained when both guiding center distributions are delta functions which are separated by a length that corresponds to the Gamow peak energy. Cases of the guiding center distributions with finite widths are also investigated.

18C. Nuclear Explosions

AD-A078 541/0 PC **A04**/MF **A01**
Assistant Secretary of Defense (Public Affairs) Washington DC
Observer Program Information Packet 1962 Test Series, DOMINIC.
1962, 60p

No abstract available.

AD-A078 542/8 PC **A19**/MF **A01**
Joint Task Force Seven Washington DC
Operation SANDSTONE Nuclear Explosions. Atomic Weapons Tests. Operation Sandstone. Annex I Part III. Volume I. Report to Joint Chiefs of Staff.
Sandstone rept. no. 4.
1948, 443p
See also Volume 1, AD-A078 563.

Contents: Communications and Electronics; Meteorology; Adjutant General, Hq JTF-7; Medical; Fiscal; Engineer; Transportation; and Photographer.

AD-A078 543/6 PC **A02**/MF **A01**
California Univ Los Angeles
Operation PLUMBBOB, Nevada Test Site, May-October 1957. Project 37.4, Measurement and Permanent Recording of Fast Neutrons by Effects on Germanium Dosimeters.
Preliminary rept.,
B. Cassen, and H. C. Gass. Sep 57, 16p AEC-ITR-1492

Laboratory and field experiments relative to the use of semiconductor fast-neutron dosimeters which were pursued on a small scale in Operation Upshot-Knothole and Operation Teapot were continued. Considerable improvements in methodology and procedures of dosimeter preparation leading to increased accuracy, reproducibility and sensitivity were obtained in interim laboratory studies. Results obtained during Operation Plumbbob that take advantage of these improvements are reported. (Author)

AD-A078 544/4 PC **A02**/MF **A01**
Exercise Desert Rock Las Vegas NV
Army Camp Desert Rock. CDR-Memo-8, 9, 10. Radiological Safety Operations.
Memorandum rept.
May 57, 18p

This memorandum prescribes procedure for the issue, turn-in and processing of film badges and the keeping of records incident thereto during Exercise DESERT ROCK VII & VIII. Procedures for monitoring and field decontamination of personnel and equipment subjected to radiological contamination are also listed as is the outline of radiological safety procedures to be followed by all personnel stationed at and/or operating from Camp Desert Rock.

AD-A078 545/1 PC **A22**/MF **A01**
Joint Task Force Seven Washington DC
Operation SANDSTONE Nuclear Explosions. Atomic Weapons Tests. Operation Sandstone. Annex I. Part II. Volume I. Report to Joint Chiefs of Staff.
Sandstone rept. no. 3.
1948, 517p
See also Annex 1, Part 3, Volume 1, AD-A078 542.

Contents: Task Group 7.2 (Army): Activities up to Embarkation, Embarkation through 'P' Day, 'P' Day thru 'Z' Day plus 2, Rollup, Conclusions; Task Group 7.3 (Navy); Air Force; Task Group 7.6 (RadSafe); and Task Group 7.7 (Iscom Kwajalein).

AD-A078 546/9 PC **A04**/MF **A01**
David Taylor Model Basin Washington DC
Operation TUMBLER-SNAPPER, Nevada Proving Grounds, April-June 1952, Project 1.13 Measurement of Air Blast Pressure VERSUS Time.
G. W. Cook, and V. E. Benjamin. Mar 53, 72p AEC-WT-521

Ground level air blast pressures were measured by the David Taylor Model Basin on the main blast line and in aircraftf parking areas for Shots 2, 3, and 4. The purpose of these measurements was two-fold: (a) to provide blastpressure data at specific locations of especial interest to Program 3 in correlating damage to aircraft on the ground and (b) to provide blast pressure data suitable for a check of azimuth symmetry and for comparison with data obtained by other activities participating in the TUMBLER-SNAPPER series of tests. Eight interferometer (Buck) gages and eight David Taylor Model Basin capacitance gages were used in the operation. Reproductions of the recorded pressure-time curves are placed in the main body of the report. In addition, peak pressure values, positive and negative phase durations, and positive and negative impulse values are tabulated for each shot. Self-contained gage stations were used to make these measurements, i.e., recordings were made at each gage locaton rather than at a central recording station. This technique appears to be quite successful and requires no costly cable trenches. The development of more compact apratus specifically designed for mounting in a small cylindrical housing underground is desirable(Author)

AD-A078 547/7 PC **A04**/MF **A01**
Ballistic Research Labs Aberdeen Proving Ground MD
Operation TUMBLER, Nevada Proving Grounds, April-June 1952, Project 1.4, Air Blast Measurements.
Dec 52, 74p AEC-WT-515
Includes errata sheet dated 10 Sep 53.

The objective of Project 1.4 was primarily to determine the general shape of that portion of a shock wave propagated near the ground but originating from an atomic explosion high in the air. Secondary objectives were the calculation of peak pressures involved and the computation of a blast efficiency for each bomb. To achieve these purposes the shock arrival time method was used with blast switches at three levels above the ground both in the regular reflection and Mach reflection regions. The air shock arrival times clearly indicated that the free air shock velocity was higher in the layer from 10 feet above the ground to ground level than it was in the layer between 50 feet and 10 feet above the ground. The increased velocity near the ground is probably due to a heated layer of air near the ground caused by radiation from the bomb. On Shot 4, the air shock arrival times corroborate the existence of a precursor shock as observed by other methods. In the Mach region the shock front appears to be vertical between the ground and 50 feet in the air. The pressures calculated for Shots 1 and 4 in the Mach region are in fair agreement with curves presented in Supplement 1 to the Capabilities of Atomic Weapons. The blast efficiencies of Shots 1 and 2 were of the order of 62.7 percent and 68 percent respectively. No blast efficiency was computed for Short 4 due to the lack of free air data.

AD-A078 548/5 PC **A03**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Operation SNAPPER, Nevada Proving Grounds, April-June 1952, Project 4.5, Flash Blindness.
Victor A. Byrnes. Mar 53, 30p AEC-WT-530

This project was designed to determine the effect of the flash of atomic detonations at night upon the ability of military personnel to carry out their assigned tasks when such tasks involve the use of vision. It is considered that in general three types of visual tasks are involved in military operations: (a) reading of instruments in ships, aircraft, tanks and vehicles; (b) central acute vision at low levels of illumination; (c) peripheral vision at very low levels. After an atomic flash each individual involved in such military visual tasks would attempt to return to seeing under the light level then available to him. The time required for him to see under each of these circumstances was determined.

Subjects were located approximately 10 miles from the detonation point. They were dark adapted in a light-tight trailer. Their eyes were exposed to the atomic flash by a shutter arrangement. Some eyes were protected by a redfilter and some eyes were unprotected. The red filter was chosen because it selectively filters the high short-wave content of the early part of the detonation and because individuals wearing it can see red lighted instruments in vehicles, ships, tanks and aircraft.

AD-A078 549/3 PC **A05/MF A01**
Chemical and Radiological Labs Army Chemical Center MD
Operation TUMBLER, Nevada Proving Grounds, April-June 1952. Project 1.9, Pre-Shock Dust,
E. H. Bouton, C. S. Elder, J. S. Kemper, and E. F. Wilsey. Oct 52, 94p AEC-WT-519

The objective of Project 1.9 was to determine the concentration and the particle size distribution of the pre-shock dust generated from the surface of the ground by air currents resulting from the incidence of thermal radiation on the surface of the ground. Cascade impactors and filter samplers were used to sample preshock dust for the brief period of time between the time of detonation and the arrival of the shock wave at the station. The following conclusions are drawn: (1) The presence of pre-shock dust in concentration of from ten to several hundred times background has been established. (2) There was no significant difference between the particle size distribution of pre-shock dust and background dust. (3) Little variation in dust concentrations from shot to shot was shown. (Author)

AD-A078 550/1 PC **A07/MF A01**
Joint Task Force Seven Washington DC
Operation SANDSTONE. Nuclear Explosions. Scientific Director's Report of Atomic Weapon Tests. Annex 17. Parts II and III. Sandia Laboratory Group and Forward Area Administration.
Sandstone rept. no. 41.
1948, 126p
See also Annex 10, AD-A078 554.

The facts and events presented here will serve as a brief summary of various activities in chronological order which are presented for the purpose of acquainting those who are interested with the necessary preparations on the part of Sandia Base personnel who were involved in Operation Sandstone. This report is not meant to be a complete historical document and will, therefore, include only those phases in which Sandia Base (Z-Division) participated. However, in order to prepare this work intelligently, it is felt that a brief outline and overlap of the entire organization is essential material and worthy of review for background. The Los Alamos Scientific Laboratory had realized since late in 1946 that only through field tests and actual detonation with proper instrumentation could the experimental designs of atomic weapons be proven and thereby obtain verification of theoretical calculations. To this extent then, on April 3, 1947, the General Advisory Committee recommended that serious consideration be given a proposed test program.

AD-A078 551/9 PC **A02/MF A01**
Exercise Desert Rock Las Vegas NV
Exercise Desert Rock VI. Annex Q. Damage Comparison Chart.
Final rept.
23 May 55, 24p
Annex Q to AD-A078 556. See also Annex L, AD-A078 561.

No abstract available.

AD-A078 552/7 PC **A04/MF A01**
Research Analysis Corp Mclean VA
Troop Performance on a Training Maneuver Involving the Use of Atomic Weapons.
Technical memo.,
Alfred H. Hausrath, Suzanne G. Billingsley, Stanley W. Davis, Henry P. Griggs, and Florence N. Trefethen. 29 Mar 52, 74p Rept no. RAC-ORO-T-170

ORO set out to appraise the performance and psychological reaction of troops undergoing their first experience with the A-Bomb. Analysts were with the troops (before, during, and after the Exercise) observing individual behavior as evidenced by views expressed publicly and privately, by conduct, and by emotional reaction indicated by the polygraph. The men performed adequately and gave no outward signs of fright. Physiological evidence showed there was significant tension. Performance, when A-Bomb is used, of typical troops in combat cannot be predicted from this maneuver. (Author)

AD-A078 553/5 PC **A05/MF A01**
Exercise Desert Rock Las Vegas NV
Exercise Desert Rock V. Annex-ABLE. Photographic Supplement. Effects of Atomic Explosion on Equipment and Clothing.
18 Apr 53, 97p
Annex ABLE to AD-A075 358. See also Annex L, AD-A078 561.

The purpose of the demonstration was to demonstrate the effects of the atomic explosion of Marine Corps equipment, and on personnel, at various distances and in various attitudes and degree of cover. To accomplish the above, equipment and clothing (on dummies to simulate personnel) layouts were prepared in five positions at different distances. The appendix 'Apparent Effects of Atomic Explosion', lists the items placed in the respective positions in the order of proximity to ground zero, and indicates (1) distance of each item from GZ, (2) degree and attitude of exposure, and (3) apparent effect of the explosion on items displayed. In general, and as far as equipment available would allow, similar items, in similar disposition, were displayed in all positions to show the contrast of effects in different distances.

AD-A078 555/0 PC **A05/MF A01**
Quartermaster Research and Development Labs Philadelphia PA
Operation SNAPPER. Test Conducted as Part of Exercise Desert Rock IV. May-June 1952. The Susceptibility to Damage and the Protection Afforded by Quartermaster Items. I. Clothing. II. Clothing Fabrics. III. Protective Cream. IV. Packaging,
John M. Davies. 26 May 53, 87p

Clothing on dummies and fabrics on panels, protective cream on panels, and boxes were exposed to the thermal radiation of Shots 6 and 8 of Operation SNAPPER as part of Exercise Desert Rock IV. Exposures were made at 4, 5, 10 and 13 langleys (1 langley equal 1 calorie per sq. cm.). Protection was measured with temperature indicators. The clothing included standard items making up various ensembles, such as hot wet, hot dry, temperate, cold wet and cold dry. The fabrics on panels included essentially the same fabric combinations and various other fabrics to study reflectance, insulation, a variety of materials, including heat treated orlon, wool and synthetic fiber blends, and arrangements, including spacing and order of layers. Except for a few items there was little damage at 5 langleys. The exceptions were the cotton nylon parka which shredded, the fur ruff which melted and the wool fabrics which scorched slightly. At 10 to 13 langleys all single layers of fabrics and all outer layers of fabric combinations were badly damaged. The damage to fabrics as clothing and on panels was about the same and any differences can be accounted for on the basis of angle of incidence.

AD-A078 556/8 PC **A11/MF A01**
Exercise Desert Rock Las Vegas NV
Exercise DESERT ROCK I.
Oct 51, 244p

The purpose of Exercise Desert Rock I was to test current doctrines to the extent afforded, to determine the effect of an atomic weapon of our equipment and materiel, to indoctrinate personnel, test their psychological reaction during the tactical employment of the weapon, and to the degree possible, determine what physical protective measures can be taken against the weapon. The Exercise was successful, and the mission assigned was accomplished. It is realized that no major change in doctrine can be developed from one test, but much valuable information has been obtained which, if correlated with data from other exercises, will furnish definite facts upon which to proceed.

AD-A078 558/4 PC **A06/MF A01**
Office of Armed Forces Information and Education Washington DC
EXERCISE DESERT ROCK (October-November, 1951). A Study of Soldier Attitudes and Knowledge about Atomic Effects.
Feb 52, 104p

EXERCISE DESERT ROCK represented an important step by the U.S. Army toward the tactical development of a major new weapon. For the first time an atom bomb was employed in a maneuver involving the actual participation of troops. The exercise was planned to provide answers to a number of basic questions. Not the least of these pertained to the reactions of the troops themselves. The atomic bomb is a weapon which has had a profound effect on the thinking of people everywhere -- and about which some awesome tales have been spread. Soldiers are not intellectually isolated. They are subject to the same sources of information and to essentially the same fears are as the rest of the population. How then did the participant troops feel before, during, and after the maneuver. How did the special training they received and the maneuver experience itself affect their knowledge about and attitudes toward atomic weapons. To what extent did those who were in on the maneuver later influence the views of non-participant troops. This report presents some answers to these questions and suggests certain conclusions that may be drawn with respect to training troops for atomic warfare.

AD-A078 559/2 PC **A17/MF A01**
Exercise Desert Rock Las Vegas NV
EXERCISE DESERT ROCK V. January-June 1953. Volume I. Operations.
Jun 53, 384p

Exercise DESERT ROCK V, the U.S. Army designation for its participation in AEC operations UPSHOT/KNOTHOLE, began on 5 January 1953 with the arrival of permanent party personnel who were to administer Camp Desert Rock and conduct operations during the exercise. Military maneuvers, designed to give military personnel indoctrination training in tactical operations featuring tactical employment of atomic devices, were conducted in connection with the explosion of seven of the ten experimental atomic devices exploded by the AEC in its Nevada Proving Ground during the months of March, April, and May 1953.

AD-A078 560/0 PC **A04/MF A01**
California Univ Los Angeles School of Medicine
Operation UPSHOT-KNOTHOLE, Nevada Proving Grounds, March - June 1953. Project 27.2. Environmental and Biological Fate of Fallout from Nuclear Detonations in Areas Adjacent to the Nevada Proving Grounds. Report to the Test Director,
Robert G. Lindberg, James T. Scanlan, James C. Watson, William A. Rhoads, and Kermit H. Larson. Feb 54, 53p AEC-WT-812

A radio-ecological survey of the area adjacent to Nevada Proving Grounds has been in progress intermittently from September 1951 to July 1953. Samples have been taken periodically of native soils, plants, and animals before, during, and after various test series at distances up to 30 miles from respective Ground Zeros. Data suggest that microcurie levels of radioactive fall-out are potentially available for absorption and/or metabolism by grazing animals at distances at least 15 miles from Ground Zero during the 24 hr following a detonation. The persistence of absorbed radioactive materials in rodent populations, as compared to the radioactive content of their isolated tissues, suggests that absorption is primarily a result of physical diffusion of available ions rather than actual metabolic selection and retention of the mixed fission products ingested or inhaled. Absorbed radioactive materials, therefore, appear to be in equilibrium with certain components of residual environmental contamination during the 90 days following a detonation.

AD-A078 561/8 PC **A12/MF A01**
Exercise Desert Rock Las Vegas NV
Exercise DESERT ROCK VII and VIII. Annex L.
1957, 251p
Annex L to the Final report, AD-A075 358.

Contents: Atomic Bursts Priscilla and Smoky; General Information; Technical Consideration - Shot

Priscilla; Equipment Display - Shot Priscilla; Damage Comparison - Predicted vs Actual - Shot Priscilla; Pre and Post Shot Photos - Shot Priscilla; Technical Considerations - Shot Smoky; Equipment Display - Shot Smoky; Damage Comparison - Predicted vs Actual - Shot Smoky; and Pre and Post Shot Photos - Shot Smoky.

AD-A078 562/6 PC **A07/MF A01**
Weather Bureau Silver Spring MD
Fallout Patterns from Operation Hardtack, Phase II,
Kosta Telegadas, and Kenneth M. Nagler. May 60, 128p

The Hardtack, Phase II, nuclear test operation differed from previous series in the great number of nuclear and safety devices detonated within a fairly brief period, in the very low yields of many of the detonations, and in the variety of burst conditions. Basic information on the various bursts is summarized on the inside of the front cover. Orientation maps of the Nevada Test Site region, and of the Nevada Test Site itself are shown on the inside of the back cover. As far as public safety is concerned, radiation from Hardtack, Phase II, was even less important than that from most previous Nevada test operations. However, since low levels of activity are fairly difficult to detect, the documentation of such fallout that did occur was comparatively difficult. The radiation from passing airborne radioactive clouds was relatively more important than in previous test series because of the many low nuclear cloud heights. There were also problems concerning decay rates and the arrival times of the fallout. The purpose of this report is to present and discuss the fallout patterns from Operation Hardtack, Phase II. Although there are many uncertainties in the analysis of the fallout data, careful consideration has been given to all available monitoring and wind information in an attempt to depict as well as possible the actual fallout patterns. (Author)

AD-A078 563/4 PC **A04/MF A01**
Joint Task Force Seven Washington DC
Atomic Weapons Tests, Operation Sandstone. 1948. Volume I. Report to Joint Chiefs of Staff.
Sandstone rept. no. 1.
16 Jun 48, 51p
See also AD-A078 571.

This report covers the operations of Joint Task Force Seven necessary to the accomplishment of its assigned mission: the construction of an atomic weapons proving ground and the conduct of tests of atomic weapons early in 1948 at the Eniwetok proving ground. The tests consisted of statically detonating by remote control three atomic bombs of new design, located on the top of 200-foot steel towers. The scientific and technical aspects of the tests, which involved measurement of the explosions and their effect by instrumentation, are not covered in detail in this report. In mounting this operation the following fundamental considerations were of primary influence in the formulation of plans and organization: (a) The tests would provide the Armed Forces with an invaluable opportunity to participate in atomic weapon development; would therefore prove an excellent training vehicle; and would, from the overall viewpoint, be of inestimable value in the gain to national preparedness and security. (b) Although the Commander, Joint Task Force Seven, was charged with responsibility for the conduct of the entire operation, Standstone was primarily a scientific test with the Armed Forces in a supporting role. (c) The security requirements imposed by the Atomic Energy Act of 1946 would be a controlling factor in the conduct of the operation. (d) The major expenditure of effort by the Armed Forces in support of this operation would be logistical in nature. (e) The international political situation would be an influencing consideration in conducting the operation.

AD-A078 564/2 PC **A05/MF A01**
Naval Medical Research Inst Bethesda MD
Operation SNAPPER, Nevada Proving Grounds, April-June 1952, Project 4.2, Biomedical Exposure Equipment,
R. H. Draeger, M. Eicher, T. S. Ely, F. T. Harris, and R. H. Lee. Dec 52, 80p AEC-WT-527

This publication describes and evaluates equipment designed for the exposure of animals and biological materials to certain effects of an atomic bomb explosion. In this sense the subject matter belongs in the same report, however, since there is considerable diversity in the effects considered, a single chapter has been devoted to each type of equipment. The first chapter is concerned with exposure to direct air blast, the second deals with the production of flashburns, the third with exposure to ionizing radiation. Certain instruments are described in the fourth chapter which are applicable to more than one type of exposure equipment. (Author)

AD-A078 565/9 PC **A11/MF A01**
Exercise Desert Rock Las Vegas NV
Exercise DESERT ROCK IV, April-June 1952.
1952, 245p
See also AD-A078 559.

The overall purpose of the report is to provide all branches of the Armed Forces with the latest information available from Exercise DESERT ROCK IV, for use in study and planning in connection with the possible employment of atomic weapons. While the principal mission of the exercise was the indoctrination of troops and observers, attention was also given to blast and thermal effects on troop equipment, materiel, and emplacements under field conditions, and on live animals. Information contained in the report is factual, but results from a series of single detonations of atomic devices of differing KT yields, differing methods of delivery, and differing heights of burst. Since no two detonations covered in the report had identical background, results from each detonation must be considered separately, and caution must be exercised in generalizing from this report on possible effects at predetermined distances from ground zero.

AD-A078 566/7 PC **A03/MF A01**
Federal Civil Defense Administration Washington DC
Operation UPSHOT-KNOTHOLE, Nevada Proving Grounds, March - June 1953, Project 22.1. Evaluation of Training Program for Radiological Defense Personnel.
Dec 53, 27p AEC-WT-808

The purpose of the project was to provide field training under actual nuclear explosion conditions for State and local civil defense personnel engaged in radiological defense planning. Previous education, training, and experience in radiological physics, health, or safety were desirable. Selected trainees reported to the Nevada Proving Grounds by April 22, 1953, where they completed a course of lectures and field exercises by May 5, 1953. All trainees were given security clearance to permit access to restricted areas and freedom of discussion with program directors, project officers, and other test officials. The trainees received background information useful to them in their preparation of radiological defense plans in their home States and communities. The trainees and test officials associated with the training course were unanimous in their praise of such radiological defense training. Experience gained by project personnel will be extremely useful in planning and conducting future training courses. (Author)

AD-A078 567/5 PC **A10/MF A01**
Exercise Desert Rock Las Vegas NV
Exercise DESERT ROCK V. Marine Corps Report.
19 May 53, 216p

The 2d Marine Corps Provisional Atomic Exercise Brigade (2d MCPAEB), was activated for the purpose of conducting the Marine Corps phase of Exercise Desert Rock V. This exercise was conducted in conjunction with an atomic test at the Nevada Proving Grounds of the Atomic Energy Commission Test Command, on 18 April 1953. This is a report of that exercise.

AD-A078 568/3 PC **A03/MF A01**
Exercise Desert Rock Las Vegas NV
Exercise DESERT ROCK VI. Marine Corps. Third Marine Corps Provisional Atomic Exercise Brigade.
Mar 55, 30p

Exercise Desert Rock VI - Marine Corps was conducted within the Nevada Test Site on 21-22 March 1955. This is a report of that exercise; it covers the following phases: Planning; training; movement to Camp Desert Rock, Nevada and return; and Conduct of the Exercise. It contains two enclosures. Enclosure (1) is a photographic supplement of the entire exercise. Enclosure (2) is a report of the effects of the nuclear detonation concerned upon the displayed materiel.

AD-A078 569/1 PC **A10/MF A01**
Exercise Desert Rock Las Vegas NV
Exercise DESERT ROCK VI. Operation 1-55. Marine Corps. Third Marine Corps Provisional Atomic Exercise Brigade.
Mar 55, 215p

This report covers the Marine Corps portion of Exercise DESERT ROCK 6 of March 1955.

AD-A078 570/9 PC **A14/MF A01**
Joint Task Force Seven Washington DC
Operation SANDSTONE. Nuclear Explosions. 1948. TG 7.6 Operations. Operation Report. Phases A, B, C, D and E.
Sandstone rept. no. 43.
20 Mar 48, 301p

This document outlines the radiological safety procedures developed for and followed during the Operation SANDSTONE Nuclear Explosions.

AD-A078 571/7 PC **A05/MF A01**
Joint Task Force Seven Washington DC
Operation SANDSTONE, Nuclear Explosions, Atomic Weapons Tests. Operation SANDSTONE, 1948. Annex I. Part I. Volume I. Report to Joint Chiefs of Staff.
Sandstone rept. no. 2.
1948, 79p
See also Annex 1, Part 2, Volume 1, AD-A078 545.

This annex contains the operational reports of agencies of Joint Task Force Seven. In general these reports are complete as submitted to the Commander of the Task Force. However, there have been some deletions in order to keep the classification 'secret' or lower, to obviate an excess of duplication between different reports and to eliminate unnecessary detail. The unabridged reports will be found in the records of Joint Task Force Seven, in custody of the Armed Forces Special Weapons Project.

AD-A078 572/5 PC **A13/MF A01**
Task Group 7.3 FPO San Francisco 96333
Operation HARDTACK. Eniwetok Proving Ground, March-August 1958.
Final rept.
1958, 279p AEC-WT-115S

Operation HARDTACK, a Joint Atomic Energy Commission-Department of Defense test series of nuclear weapons and devices was conducted by Commander, Joint Task Force SEVEN at the Eniwetok Proving Ground during the spring and summer of 1958. The Chief of Staff of the United States Air Force was the Executive Agent of the Joint Chiefs of Staff for the conduct of the test series. The Naval participation in this Operation was provided by Task Group 7.3. Thirty-five detonations took place at Einwetok, Bikini and Johnston Island. A listing of all shots is appended to this section. The peak strength of Task Group 7.3 consisted of 6,822 personnel. A ship rotation policy increased the number of Naval Personnel who were able to receive indoctrination and training in nuclear weapon tests to a total of 9,178.

AD-A078 573/3 PC **A06/MF A01**
Los Alamos Scientific Lab NM
Operation Tumbler-Snapper, Nevada Proving Grounds, April-June 1952. Report of the Advisory Personnel to the Air-Sampling Program,
William S. Johnson, Edwin C. Hyatt, and Harry F. Schulte. Jun 53, 123p AEC-WT-566

The Industrial Hygiene Group of the Los Alamos Scientific Laboratory (LASL) Health Division was called upon by the Radiological Safety (Rad-Safe) Unit, organized for Operation Tumbler-Snapper at the Nevada Proving Grounds, to act in an advisory capacity for their air-sampling program. This report presents the results of the program, as well as an evaluation of the administrative, personnel, and

equipment requirements necessary to provide these results on subsequent tests. In all considerations of the air-sampling program for Tumbler-Snapper, time played a most decisive role. This was particularly the case in the advance preparation for such a program. That time did assume such importance is mentioned at the start of this report as an indication from experience that an air-sampling project cannot be expected to be entirely satisfactory when included as an afterthought. (Author)

AD-A078 574/1 PC **A04/MF A01**
Air Force Cambridge Research Labs Hanscom AFB MA
Operation SNAPPER, Nevada Proving Grounds, April-June 1952. Project 1.1, The Measurement of Free Air Atomic Blast Pressures,
Norman A. Haskell, and James O. Vann. Feb 53, 62p AEC-WT-511

Shock overpressure as a function of time has been measured by utilizing an array of parachute-borne pressure gages spread over a wide range of distances and altitudes above two atomic detonations. The operation was accomplished by deploying 16 parachute-borne canisters from two aircraft at each shot. Each canister contained an altimeter transducer, two differential pressure transducers, a radio telemetry transmitter, and a radio tracking beacon. The telemetered pressure data were recorded at a ground station and the position of each canister was determined by radio range measurements from three multiple object tracking stations. The dropping aircraft were guided to a predetermined drop point with reference to both position and time by two SCR 584 radar stations. (Author)

AD-A078 575/8 PC **A14/MF A01**
National Bureau of Standards Washington DC
Operation JANGLE. Nevada Proving Grounds, October-November 1951, Gamma Radiation Measurements,
Louis Costrell. 1 Apr 52, 313p AEC-WT-370

Gamma ray dosage rates were determined as a function of time and distance. The method of measurement and the equipment used is described. Dose rates as a function of time were obtained for 27 stations on the surface burst and for 29 stations on the underground burst. Total dose data was obtained by integration of the dose rates. Dose rate and integrated dose as a function of time are presented for all of the stations. One hour dose rate contours are presented as well as 10 minute, 1 hour, and 10 hour integrated dose contours. All of the above mentioned data is presented in the form of curves. In addition 10 second dose versus distance curves for the surface and underground bursts are presented on a single graph for ready comparison. (Author)

AD-A078 576/6 PC **A02/MF A01**
Joint Task Force Three Washington DC
Operation GREENHOUSE.
1951, 20p

Contents: Development of Operation GREENHOUSE; General Information; Information on the Marshall Islands; and Hazards Resulting from Atomic Bomb Explosions.

AD-A078 577/4 PC **A10/MF A01**
Defense Atomic Support Agency Washington DC
Operation JANGLE. Nevada Proving Grounds, October - November 1951, Blast and Shock Measurements II.
Mar 52, 221p AEC-WT-367

At the time of the JANGLE underground shot the rate of progression of the underground wave was measured. In addition, an attempt was made to record the rate of expansion of the fireball and the point of breakaway of the shock front from the fireball. In obtaining close-in measurements of blast phenomena, recording is difficult because of ionization in cables produced by gamma radiation and electrical differences in potential set up by ground currents produced at the time of detonation. To overcome these difficulties and derive a suitable system, several methods were considered, tested, rejected, or modified, some as late as two weeks before the blast. Some of the methods considered and rejected were (1) the Wiancko accelerometers (variable reluctance type), (2) the closed loop resistance method, and (3) the open switch (light recording) method. The two methods finally decided upon were the normally closed thyratron switch and the normally open thyratron switch. For the first method a diaphragm-actuated switch was developed, the opening of which removed a fixed bias on a thyratron tube, permitting it to conduct. The switch for the second method was basically the same as that for the first except that the action of the diaphragm closed the switch and shorted out the bias on a thyratron tube, causing it to conduct.

AD-A078 578/2 PC **A03/MF A01**
Naval Radiological Defense Lab San Francisco CA
Contamination Patterns at Operation JANGLE,
R. K. Laurino, and I. G. Poppoff. 30 Apr 53, 31p Rept no. USNRDL-399

The distributions of contamination resulting from bursts at Operation JANGLE have previously been represented on maps as iso-intensity contours. This report uses the data and maps of three projects, and combines this information. The result is two modified iso-intensity maps-one for the surface burst at Operation JANGLE, and one for the underground burst. These modified iso-intensity patterns are believed to be more useful than the maps which were previously made because a wider range of intensities is presented. (Author)

AD-A078 579/0 PC **A11/MF A01**
Joint Task Force Seven Washington DC
Operation WIGWAM.
25 Mar 55, 235p Rept no. JTF-OPLAN-1-55

The Joint Chiefs of Staff have recognized the necessity for a deep underwater test of an atomic weapon to be conducted as a Joint Department of Defense/Atomic Energy Commission test. The Chief of Naval Operations has been designated as the Executive Agent of the Joint Chiefs of Staff to conduct this test, under the code name of Operation WIGWAM. The chief objective of Operation WIGWAM is to determine with satisfactory accuracy at what ranges, under various conditions, a submarine or surface vessel will be destroyed by a deep underwater atomic explosion. The second objective is to determine the hazards to the delivery vehicle and its supporting forces. (Author)

AD-A078 580/8 PC **A04/MF A01**
Los Alamos Scientific Lab NM
Operation RANGER Nevada Test Site, January-February 1951. Volume 6. Administrative Summary Report,
Carroll L. Tyler. Jul 52, 55p AEC-WT-205

Part I of this volume is a general summary of the administrative and support activities of Operation RANGER, as performed under the direction of the Manager, SFO, in accordance with delegated authority from the General Manager in January and February 1951. The technical report of this Operation is included in separate volumes prepared in the Los Alamos Scientific Laboratory. Part II contains more specific coverage of various phases of this Operation and serves to amplify the general information given in Part I. Each of the sections of Part II was prepared by the AEC official charged with the operational phase covered. It is intended that this volume serve not only as a record of the administrative and support activities but as a guide for the future AEC execution of test programs performed within the continental limits of the United States. In some instances specific recommendations have been incorporated for future consideration, and certain of these recommendations have already been utilized in the planning for Operations BUSTER and JANGLE at the Nevada Test Site.

AD-A078 820/8 MF **A01**
Exercise Desert Rock Las Vegas NV
Exercise Desert Rock VI. Operation Order Number 2.
Feb 55, 37p
Availability: Microfiche copies only.

Atomic Energy Commission will detonate an Atomic missile D-Day, H-Hour which approximately 1013 Armed Forces personnel will observe, and 109 US Army personnel will participate to test equipment and training doctrine. Headquarters Exercise Desert Rock VI will conduct Exercise Desert Rock VI-2, Shot WASP, area T-6-4, D-Day, H-Hour, at the Nevada Test Site to: (1) Indoctrinate observers with the actual detonation of an Atomic Device; (2) Provide instruction and experience for individual protection against nuclear radiation and blast effects; (3) Obtain information, test equipment, and train operators for F.A. Observation Battalions; and (4) Instruct personnel and test training doctrine for 6th Army CBR Defense Teams.

AD-A078 821/6 PC **A03/MF A01**
Atomic Energy Commission Washington DC
Operation TEAPOT, Nevada Test Site, February-May 1955. Project 30.3. Measurements of Beta and Gamma Ray Characteristics of Shot Debris and Fall-Out of Nuclear Weapons.
Preliminary rept.,
H. D. LeVine, and R. T. Graveson. May 55, 46p Rept no. AEC-ITR-1185

The distribution of fall-out debris and radiation intensities over wide areas may be rapidly surveyed from the air. The development of instruments and techniques must be based on consideration of the beta and gamma characteristics of the radioisotopic constituents of the fall-out material. Radiation measurements in an aircraft may be related to surface conditions by an altitude correction factor, which has been determined by field measurements. Development and field testing, during the Teapot series, has resulted in a group of instruments useful for study of the radiation characteristics of fall-out debris. An aerial survey detector with automatic altitude compensator and a telemetering unit was also completed and tested.

AD-A078 822/4 PC **A03/MF A01**
Atomic Energy Commission Washington DC
Operation PLUMBBOB, Nevada Test Site, May-October 1957. Project 39.3. Thermal Radiation Measurements. Parts I and II.
Preliminary rept.,
A. L. Greig, and Herman E. Pearse. 23 May 58, 33p Rept no. AEC-ITR-1502

The objective of Part I of Project 39.3 was to measure transient air temperatures at selected locations in the blast-biology underground shelter in Area 1 for shot Galileo, Operation Plumbbob. The objective of Part II of Project 39.3 was to evaluate thermal burns from a nuclear explosion on biological receivers in a shelter. Eight Chester White pigs were used as test animals. One pig in the entrance and one about 3 ft inside the door received severe burns. These burns were carbonized on the surface and caused transepidermal damage with up to 0.3 mm penetration into the dermis. Animals away from the entrance and those in the slow fill side received no burns. The possible sources of this damaging thermal energy are discussed.

AD-A078 823/2 PC **A03/MF A01**
Nevada Test Organization (AEC) Mercury Off-Site Radiological Safety Activities
Operation HARDTACK, Phase I. Task Group 7.5. Radiological Safety Support,
Carl Minkkinen, Henry P. Schlacks, Roscoe H. Goeke, and Charles L. Weaver. Apr 59, 46p Rept no. AEC/OTO-58-3

The Rad-Safe organizational arrangement for this Operation, the Rad-Safe personnel of TG 7.5 functioning as an independent Rad-Safe organization for TG 7.5, proved satisfactory and demonstrated that the AEC Contractor could adequately supply radiological safety service for TG 7.5.

18D. Nuclear Instrumentation

AD-A078 516/2 PC **A04/MF A01**
Panametrics Inc Waltham MA
Design, Construction and Testing of a Magnetic Electron Spectrometer for Detecting Electrons to 10 MeV, Including a Preliminary Design for a Flight Unit.
Final rept. Jun 77-Sep 79,
Frederick A. Hanser, and Bach Sellers. Sep 79, 68p AFGL-TR-79-0229
Contract F19628-77-C-0180

A magnetic electron spectrometer for electrons to 10 MeV energy has been designed, constructed,

and tested. The magnet assembly uses rare-earth/cobalt magnets and achieves a gap field of 4 - 4.5 kG. The operation of the spectrometer was tested with beta sources and position sensitive detectors. It was found that a coincidence detector in the entrance collimator eliminates most of the bremsstahlung background. Some internal baffles are also necessary to reduce scattered electron background. The tests showed that a magnetic spectrometer which can analyze electrons to more than 10 MeV can be readily constructed. A preliminary design for a flight unit magnetic electron spectrometer is given. (Author)

N80-14380/3 PC **A04**/MF **A01**
Fulmer Research Inst. Ltd., Stoke Poges (England).
Space Dosimetry. Volume 1: Project Description.
Final Report.
A. Holmes-siedle. 1978, 67p FRI-R646/3-V-1, ESA-CR(P)-1176-V-1
Contract ESA-2440/74-HP

The dosimetry of radiation sources and the design as well as procurement of special dosimetric MOS devices (the TOT series) are discussed. The devices were first used for laboratory dosimetry and, later, incorporated in two ESTEC flight units which are now monitoring internal radiation in geostationary orbit. The final transistors produced (TOT200 series) show good dosimetric properties and are more radiation-sensitive than any conventional transistor. Other support was given to ESTEC in the areas of physical analysis, thermoluminescence studies, the provision of a calibrated cobalt-60 source and some space environment analyses.

N80-14771/3 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Langley Station, VA. Langley Research Center.
Computational Methods for Analyzing the Transmission Characteristics of a beta Particle Magnetic Analysis System.
J. J. Singh. Dec 79, 53p NASA-TM-80179, L-13345

Computational methods were developed to study the trajectories of beta particles (positrons) through a magnetic analysis system as a function of the spatial distribution of the radionuclides in the beta source, size and shape of the source collimator, and the strength of the analyzer magnetic field. On the basis of these methods, the particle flux, their energy spectrum, and source-to-target transit times have been calculated for Na-22 positrons as a function of the analyzer magnetic field and the size and location of the target. These data are in studies requiring parallel beams of positrons of uniform energy such as measurement of the moisture distribution in composite materials. Computer programs for obtaining various trajectories are included.

18E. Nuclear Power Plants

PB80-900200 Subscription
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Environmental Standard Review Plans for the Environmental Review of Construction Permit Applications for Nuclear Power Plants, Updates.
1980, approx. 25 issues
Paper copy available on subscription, North American Continent price $60.00/year; all others write for quote. Basic report available as PB80-900299.

This subscription item provides updates to the NRC's environmental standard review plans (ESRPs). These ESRPs are instructions for conducting the environmental review of applications for nuclear power plant construction permits.

PB80-900299 PC**$20.00**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Environmental Standard Review Plans for the Environmental Review of Construction Permit Applications for Nuclear Power Plants.
May 79, 864p NUREG-0555
For updates see, PB80-900200.

Environmental standard review plans (ESRPs) are instructions for conducting the environmental review of applications for nuclear power plant construction permits. The plans were developed by the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation for use by the NRC staff. The ESRPs may be used by others to: (1) identify the kinds of data and information needed by the staff, and (2) to review the manner in which the staff identifies and assesses environmental impacts and determines their significance. ESRPs follow an environmental impact statement outline that will address the range of environmental factors and conditions expected for the majority of nuclear power plant applications. Flexibility is provided to expand or contract the outline to account for site-specific conditions. Each ESRP describes: (1) the purpose and scope of the review, (2) the data and information needed for the review, (3) the analysis procedure, (4) the evaluation procedure, and (5) the information to be provided in the environmental impact statement. Draft ESRPs were issued in 1977, and these final plans reflect staff consideration of all comments received.

18I. Reactor Engineering and Operation

NUREG/CR-0484 PC **A07**/MF **A01**
Argonne National Lab., IL.
Vehicle Access and Control Planning Document.
Rept. for Oct 77-Sep 79,
James E. Obermiller, and H. Joe Wait. Nov 79, 130p
Prepared in cooperation with Mason and Hanger-Silas Mason Co., Inc., Lexington, KY.

This document has been prepared as an aid in planning a vehicle access and control system at nuclear fixed site facilities. In this document, various threats have been postulated and countermeasures proposed. Although many of the threats and countermeasures may exceed those presented in Title 10, Code of Federal Regulations, (CFR), Part 73, this was done to present an in-depth study of planning options that might apply to each nuclear fixed site facility. Therefore, the reader should keep in mind the following: (1) options presented need not be considered as requirements which have to be met to comply with Title 10, Code of Federal Regulations (CFR Part 73.2) and (2) overall, the options may appear to vary between inadequate and very excessive. However, when considered as part of a particular facility's physical security system, any one option may prove to be of the most value in helping to reduce the threat to that facility.

NUREG/CR-0485 PC **A07**/MF **A01**
Argonne National Lab., IL.
Vehicle Access and Search Training Manual.
Rept. for Oct 77-Sep 79,
James E. Obermiller, and H. Joe Wait. Nov 79, 135p
Prepared in cooperation with Mason and Hanger-Silas Mason Co., Inc., Lexington, KY.

This Vehicle Access and Search Training Manual is intended to assist NRC-licensed organizations and their security personnel in developing vehicle access, control and search operations necessary at nuclear fuel cycle facilities and at reactor facilities. The manual is based on security requirements prescribed by The Nuclear Regulatory Commission as contained in Title 10 of the Code of Federal Regulations, Part 73, 'Physical Protection of Plants and Materials.' As a condition of the licensing agreement, the licensee is required to maintain a physical protection system which includes a training program for security personnel. The manual includes lesson plans in (1) controlling vehicle entry and exit, (2) searching for contraband, and (3) protecting the facility from sabotage and/or theft of special nuclear materials. These training guidelines provide information and instruction for self-study, discussion and hands-on training. A job knowledge test reviews the entire training program.

NUREG/CR-0919 PC **A05**/MF **A01**
Sandia Labs., Livermore, CA.
SOURCE User's Guide.
Technical rept.,
K. Gee Stimmell, D. L. Mitchell, and F. J. Cupps. Dec 79, 85p SAND-79-8004
Contracts NRC-60-78-096, DE-AC04-76DP00789

SOURCE is a Monte Carlo simulation of the ambush of a road convoy by adversaries wielding small arms. It was constructed to examine the sensitivity of convoy survivability to variations in convoy and adversary characteristics. This user's guide is intended to supplement an earlier report (NUREG/CR-0641) which described the model and presented an example sensitivity study.

NUREG/CR-0984 PC **A11**/MF **A01**
Sandia Labs., Albuquerque, NM.
Advanced Reactor Safety Research, Quarterly Report April-June 1979.
Jan 80, 240p SAND-79-1597-VOL-10
See also NUREG-CR-0820.

Sandia Laboratories, Albuquerque, New Mexico is conducting the Advanced Reactor Safety Research Program on behalf of the U.S. Nuclear Regulatory Commission (NRC). The overall objective of the program is to provide NRC a comprehensive data base essential to defining key safety issues, understanding the controlling accident sequences, verifying the complex computer models used in accident analysis and licensing reviews, and assuring the public that advanced power reactor systems will not be licensed and placed in commercial service in the United States without appropriate consideration being given to their effects on health and safety.

PB80-920100 Subscription
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, Updates.
Irregular repts.
1980, Open series
Supersedes NTISUB/E/201.
Paper copy available on subscription, North American Continent price $30.00/year; all others write for quote. Basic report available as PB80-920199.

The Standard Review Plan (SRP) is prepared for the guidance of staff reviewers in the Office of Nuclear Reactor Regulation in performing safety reviews of applications to construct or operate nuclear power plants. The principal purpose of the SRP is to assure the quality and uniformity of staff reviews, and to present a well-defined base from which to evaluate proposed changes in the scope and requirements of reviews. It is also a purpose of the SRP to make information about regulatory matters widely available and to improve communication and understanding of the staff review process by interested members of the public and the nuclear power industry. The Standard Review Plan is written so as to cover a variety of site conditions and plant designs. Each section is written to provide the complete procedure and all acceptance criteria for all of the areas of review pertinent to that section. However, for any given application, the staff reviewers may select and emphasize particular aspects of each SRP section as is appropriate for the application.

18J. Reactor Materials

NUREG/CR-0675 PC **E08**/MF **A01**
Oak Ridge National Lab., TN.
Test of 6-in.-Thick Pressure Vessels. Series 3: Intermediate Test Vessel V-8.
Technical rept.
R. H. Bryan, D. A. Canonico, P. P. Holz, S. K. Iskander, and J. G. Merkle. Jan 80, 223p ORNL/NUREG-58
Contract W-7405-eng-26
Document includes 2 48X reduction microfiche inserts.

Intermediate test vessels V-8, a 152-mm-thick vessel fabricated of SA 533, grade B, class 1 steel, was pressurized to failure at a test temperature of -23C. The vessel contained a large fatigue-sharpened notch adjacent to half-bead weld repair that had not been stress relieved. Residual stresses and fracture toughnesses were determined before the pressure test by measurements on a prototypic weld, and fracture predictions were made by linear elastic fracture mechanics. Predictions agreed well with results of the test, which demonstrated the im-

portant influence of high residual stresses on fracture behavior.

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A078 807/5 PC A13/MF A01
Honeywell Inc Hopkins MN Defense Systems Div
XM587E2/XM724 Electronic Time Fuzes: Developmental Test/Operational Test (DT/OT) II Test Phase.
Final rept. 1 Feb 77-31 Jul 79,
W. L. Aschenbeck. Nov 79, 288p 47512, HDL-CR-79-056-2
Contract DAAG29-77-C-0056

This report documents the continuation of activities and accomplishments in the further development of the XM587E2 and XM724 Electronic Time (ET) fuzes. The hardware built under this effort provided quantities of fuzes for use in Development Test/Operational Test (DT/OT) II Testing, spare piece parts, dummy fuzes, training models of the fuzes and display itmes. This effort also included an investigation into the feasibility of simplifying the hybrid circuits used in the fuze electronics. In addition, this effort included the development of an electronics assembly with all components mounted on a single printed circuit card.

AD-A078 915/6 PC A03/MF A01
Army Armament Research and Development Command Dover NJ Large Caliber Weapon Systems Lab
Minimum Non-Propagation Distance for 76.2 kg (168 lb) of Flake TNT in Interconnecting Building Ramps.
Final rept. Jul 78-Mar 79,
William M. Stirrat. Nov 79, 39p ARLCD-TR-79018, AD-E400 376

A series of tests were performed to establish the minimum non-propagation distances between 76.2 kg (168 lb) of flake TNT contained in aluminum tote bins for two types of interconnecting building ramps simulating the actual plant conditions at Holston Army Ammunition Plant, Kinsport, Tennessee. The test results show that the minimum propagation distance for ramps with wood frames and sides is 15.2 meters (50 feet) and for ramps with steel frames and fiberglass sides, it is 18.1 meters (60 feet).

AD-A078 916/4 PC A03/MF A01
Rockwell International Thousand Oaks CA Science Center
Rapid Ultrasonic Inspection of Artillery Projectiles. Revision.
Final rept. 29 Sep-20 Dec 78,
Murray W. Mahoney, and Joseph H. Mulherin. Nov 79, 50p SC5186.24FR-REV, ARSCD-CR-79009, AD-E400 375
Contract DAAK10-73-C-0409
Supersedes report dated Aug 79, AD-A073 426.

Results of a 3-month study to evaluate metallurgical and acoustic properties of HF-1 steel are presented. The objectives were to determine the cause of and solution for reduced ultrasonic signal generation efficiencies evident during ultrasonic inspection of M549 (RAP) artillery projectiles with electromagnetic acoustic transducers(EMATs). It was shown that reduced generation efficiencies were the result of an in-process heat-treatment during fabrication and that the phenomenon was limited to the first approximately 0.007 in. (0.178 mm) of surface material. Accordingly, surface material was examined prior to and following heat-treatment to determine the metallurgical and/or morphological changes that cause this impedence. A hypothesis is that reduced ultrasonic signal efficiencies are possibly the result of a weakly magnetic continuous grain boundary phase of Fe3C. Some results are contradictory, however, and as such, studies should be continued to further evaluate this hypothesis.

AD-A078 922/2 PC A05/MF A01
Avco Systems Div Wilmington MA
Base Fuze for 30MM H.E.D.P. Projectile.
Final rept. 5 Apr-31 Nov 78,
A. Antonuzzi, C. M. Conlon, Jr., and W. J. Warren. 12 Dec 78, 92p AVSD-0336-78-CR, ARSCD-CR-79001, AD-E400 287
Contract DAAK10-78-C-0141

This report describes the base fuze design for a 30MM high explosive dual purpose projectile that resulted from an analysis of many fuze concepts. Features of the fuze design were tested and evaluated in the laboratory using simulated gun launch environments. The base fuze design was fabricated and assembled into test projectiles and gun-tested to measure fuze performance. The fuzes functioned in less than 25 microseconds on impacts against aluminum targets at impact angles of 0 to 45 degrees obliquity and at an impact velocity of 600 meters per second. (Author)

PB80-115280 PC A10/MF A01
Bureau of Alcohol, Tobacco and Firearms, Washington, DC.
National Conference on Explosives Control (1st), Held at New Orleans, Louisiana on September 25-27, 1979(Minutes).
Final rept.
Sep 79, 219p

The report presents the text of presentations by Federal Agencies, State Agencies, and industry associations before the September 25 to 27, 1979, conference on explosives control held in New Orleans. Summaries are included covering main topics covered during conference workshops.

19C. Combat Vehicles

AD-A078 945/3 PC A02/MF A01
Army Test and Evaluation Command Aberdeen Proving Ground MD
Wheeled and Tracked Vehicle Air Cleaner Adequacy.
Final rept. on test operations procedure.
7 Dec 79, 12p Rept no. TOP-2-2-819

This report prescribes a method of evaluating air cleaner adequacy in wheeled and tracked vehicles in the desert environment. (Author)

19D. Explosions, Ballistics, and Armor

AD-A078 521/2 PC A03/MF A01
Colorado State Univ Fort Collins Dept of Civil Engineering
Blast Induced Liquefaction Potential. Influence of Unsaturated Conditions.
Final rept. 1 Mar 78-28 Feb 79,
Wayne A. Charlie, and Joseph P. Martin. 26 Sep 79, 32p AFOSR-TR-79-1283
Grant AFOSR-78-3598

The phenomenon called blast induced liquefaction is examined. Blast induced ground motions which may cause liquefaction are categorized on the basis of wave form characteristics and motion types and compared to earthquake groundmotions. Prediction methods used in Russia, Europe and North America are reviewed. The influence of field tests on unsaturated subsurface soils in respect to liquefaction potential, porewater pressure increase, porewater pressure measurement, shock wave velocity and scaling factors are given. The occurrence, detection, and removal of entrapped gas are reviewed. Recent research has shown that the assumption of little or no soil property change may be non-conservative for certain saturated soil subjected to loadings from high explosive test events. Various indirect evidence indicates that blast induced liquefaction (a soil property change) may occur. Any attempt to correlate the results of blast-induced liquefaction with data obtained in conjunction with earthquake loadings must include the many differences between the two. However, important material property changes common to both seem to be pore-water pressures, shear strength, and relative density. The effect of soil type and magnitude and type of stress changes, induced by overpressure and direct induced ground motion, are also controlling factors. Until additional research is completed, loose saturated sands should be regarded as having a high blast-induced liquefaction potential. (Author)

AD-A078 921/4 PC A02/MF A01
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Sensitivity Coefficient of Exterior Ballistics with Velocity Square Damping.
Technical rept.,
C. N. Shen. Oct 79, 25p ARLCB-TR-79028, AD-E440 054
Presented at the Silver Jubilee Conference of Army Mathematicians (25th) 6-8 Jun 79, Johns Hopkins Univ., Baltimore, MD.

The principal equation of exterior ballistics has a drag term which, in this case, is proportional to the square of the velocity in the tangential direction of the projectile. The sensitivity coefficient is expressed as the ratio of the initial elevation angle deviation to the initial percentage velocity deviation. The work in this paper is to find analytically the sensitivity coefficient of the exterior ballistics with velocity square damping which comes from the nonlinear air resistance for a projectile. This principal equation is integrated analyticaly in obtaining the solution for tangential velocity in terms of the elevation angle, together with all the necessary initial conditions. The horizontal range and the vertical range are also expressed as integrals of certain function of the elevation angles.

PB80-804495 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Lightweight Armor (Citations from the NTIS Data Base).
Rept. for 1964-Jan 80,
Diane M. Cavagnaro. Feb 80, 211p
Supersedes NTIS/PS-79/0093, NTIS/PS-78/0117 and NTIS/PS-77/0130.

Aspects of lightweight armor are presented, including reports on body and transparent armor. The studies cover armor fabrication, theory, terminal ballistics tests, performance evaluation, and human engineering. Most of the armor is made from ceramics, plastics, or glass. (This updated bibliography contains 204 abstracts, 10 of which are new entries to the previous edition.)

19F. Guns

AD-A078 587/3 PC A05/MF A01
Iowa Inst of Hydraulic Research Iowa City
Fluid and Thermodynamic Characteristics of Compressible Recoil Mechanism.
Final rept. Jun 78-Aug 79,
Ching Jen Chen, and Enzo O. Macagno. Aug 79, 80p ARO-16016.1-A-3E
Contract DAAG29-78-G-0120

Fluid dynamic aspect of recoil mechanisms is studied with simple one dimensional analysis as well as two dimensional numerical analysis. Method and procedure for experimental simulation is given. Full scale and reduced scale simulation is analyzed for its advantages and disadvantages. A new numerical scheme called 'finite differential' method is developed to solve the two dimensional unsteady Navier-Stokes equation. The new method utilizes the local analytical solution of the total problem. The solution of the problem is obtained by assembling the local analytic solution. The method is shown to be capable of solving flows with high Reynolds numbers. (Author)

20. PHYSICS

20A. Acoustics

AD-A078 361/3 PC A02/MF A01
Stanford Univ CA Microwave Lab
Significant Accomplishments.
Rept. for 1 Jun 74-31 May 75.
Sep 75, 5p Rept no. ML-2480
Contract N00014-75-C-0632

Contents: Acoustic Microscope, New Acoustic Imaging Techniques, Video Bandwidth Compression Using Surface Acoustic Waves, and Application of Acoustic Scanning to Non-Destructive Testing of Materials.

Group 20A—Acoustics

AD-A078 383/7 PC **A02**/MF **A01**
Rosenstiel School of Marine and Atmospheric Science Miami FL
Speed of Sound in Seawater at High Pressures.
Chen-Tung Chen, and Frank J. Millero. 4 Apr 77, 9p
Contract N00014-75-C-0173, Grant NSF-OCE73-00351
Pub. in Jnl. of Acoustical Society of America, v62 n5 p1129-1135 Nov 77.

No abstract available.

AD-A078 402/5 PC **A02**/MF **A01**
Weapons Systems Research Lab Adelaide (Australia)
A Surface Duct Leakage Term Applicable to Shallow Ducts at Low Frequencies.
Technical rept.,
G. Gartrell. Jun 79, 21p Rept no. WSRL-0099-TR

A new term is proposed for inclusion in a formula in common use for the calculation of acoustic propagation loss to extend its range of applicability to a shallow duct at low frequencies. (Author)

AD-A078 434/8 PC **A05**/MF **A01**
Yale Univ New Haven CT Systems and Information Sciences
Surface Scattering Studies.
Final rept. Apr 78-Jun 79,
J. G. Zornig, P. M. Schultheiss, J. Snyder, S. Singhal, and D. C. Gilbert. Aug 79, 99p Rept no. S/IS-7905
Contract N00014-75-C-1014

Progress in a number of ongoing projects is reported. These include studies of bistatic and monostatic surface scattering strength, surface reverberation modelling, measurement of slope and correlation statistics of surfaces, and measurement of Doppler shifts and spread. The extension of previous scattering strength measurements to lower frequencies has shown the strengths observed to be 10 to 15 dB higher under similar wind conditions but with wavelengths approximately 8 times longer. These studies have led to the beginning of development of a model for reverberation based on a characterization of the surface as an ensemble of facets. A method for precision measurement of model tank waveheight and wave slope time series has been developed. The system is based on fine wire capacitance probes. It has been used to compile a set of slope measurements which is consistent with data reported by other investigators. A system for automatic measurement of time-space waveheight correlation has been developed.

AD-A078 539/4 PC **A08**/MF **A01**
Office of Naval Research Arlington VA Acoustic Environmental Support Detachment
The FACT Model. Volume II.
Final rept.,
C. L. Baker, and C. W. Spofford. Dec 74, 158p Rept no. AESD-TN-74-04-VOL-2
See also Volume 1, AD-A078 581.

The FACT (Fast Asymptotic Coherent Transmission) Model is the new Navy Interim Standard Transmission Model for Ocean environments which may be treated within the context of a single sound-speed profile and a flat bottom. It is a ray-acoustics model designed for the computation of transmission loss as a function of range and frequency at fixed depth. The classical ray treatment has been augmented with higher order asymptotic corrections in the vicinity of caustics, and the phased addition of selected paths experiencing significant, predictable coherence effects. The computer program is fully automated requiring only the specification of the environment and the essential parameters. The second volume describes the program structure and flow with complete samples of input and output and is intended primarily for programmers attempting to implement the model on their computers.

AD-A078 581/6 PC **A05**/MF **A01**
Maury Center for Ocean Science Washington DC
The FACT Model. Volume I,
C. W. Spofford. Nov 74, 76p Rept no. MC-109-VOL-1
See also Volume 2, AD-A078 539.

The FACT (Fast Asymptotic Coherent Transmission) Model is the new Navy Interim Standard Transmission Model for ocean environments which may be treated within the context of a single sound-speed profile and a flat bottom. It is a ray-acoustics model designed for the computation of transmission loss as a function of range and frequency at fixed depth. The classical ray treatment has been augmented with higher order asymptotic correction in the vicinity of caustics, and the phased addition of selected paths experiencing significant, predictable coherence effects. The computer program is fully automated requiring only the specification of the environment and the essential parameters. The first volume describes the physics and mathematics contained in the FACT model as well as comparisons of FACT and normal-mode results.

AD-A078 946/1 PC **A02**/MF **A01**
Naval Underwater Systems Center New London CT New London Lab
Attenuation of Low Frequency Sound in the Sea: A Bibliography.
Technical document,
David G. Browning, and Robert H. Mellen. 26 Nov 79, 24p Rept no. NUSC-TD-6097

This technical document contains a listing of all NUSC papers, presentations, and reports concerning the study of the attenuation of low frequency sound in the sea. A short historical narrative is included. (Author)

N80-14842/2 PC **A08**/MF **A01**
Stanford Univ., CA. Dept. of Aeronautics and Astronautics.
Effects of Friction and Heat Conduction on Sound Propagation in Ducts.
P. Huerre, and K. Karamcheti. Aug 76, 159p
NASA-CR-162556, JIAA-TR-4
Grant NSG-2007, Contract NGL-05-020-275

The theory of sound propagation is examined in a viscous, heat-conducting fluid, initially at rest and in a uniform state, and contained in a rigid, impermeable duct with isothermal walls. Topics covered include: (1) theoretical formulation of the small amplitude fluctuating motions of a viscous, heat-conducting and compressible fluid; (2) sound propagation in a two dimensional duct; and (3) perturbation study of the inplane modes.

20B. Crystallography

AD-A078 638/4 PC **A03**/MF **A01**
Electronics Research Lab Adelaide (Australia)
The Measurement of Temperature Instabilities and Their Effect on the Liquid Phase Epitaxial Growth of Gallium Arsenide.
Technical rept.,
M. Folkard. Aug 79, 34p Rept no. ERL-0077-TR

Epitaxial layers grown on gallium arsenide substances using the steady state temperature gradient form of liquid phase epitaxy have a much larger growth rate than that calculated for diffusion-limited conditions. In addition, and of major importance for device fabrication, there is a large variation in epilayer thickness over the surface of a single sample, and non-reproducibility from sample to sample. The present report describes various measurements of the temperature and its local variation within the gallium melt solution, and attempts to relate the observed variations and instabilities to the epitaxial layers actually grown. (Author)

AD-A078 694/7 PC **A02**/MF **A01**
Brandeis Univ Waltham MA Dept of Chemistry
Structure of Tris (2-Cyanoethyl) Phosphine Oxide.
Interim rept.,
Bruce M. Foxman, Choong Hyun Kim, and Harry Mazurek. 1 Dec 79, 16p Rept no. TR-5
Contract N00014-76-C-0822

(O)P(CH2CH2CN)3, rhombohedral, R3c, a = 13.501(4)A, c = 10.177(3)A (hexagonal setting), z = 6 Rho sub o = 1.297 g/cc, Rho sub c = 1.30 g/cc. The molecule has three-fold rotational symmetry along the P-O bond axis with a C-P-C angle of 106.43(12) deg. The P=O distance is 1.485(3)A.

20C. Electricity and Magnetism

N80-14790/3 PC **A04**/MF **A01**
European Space Agency, Paris (France).
Computation of the Electrodynamic Behavior of Complicated Structures by Means of the Integral Equation Method.
V. Stein. May 79, 55p ESA-TT-598, DFVLR-FB-78-18
Tran-Transl. into English of 'Berechnung der Elektrodynamischen Eigenschaften Komplizierter Strukturen MIT Hilfe der Integralgleichungsmethode - Anwendungsbeispiele. Misc-Original German Report Available from Dfvlr, Cologne Dm 20,70.

The computer programs based on the integral equation method are briefly described. Using these programs numerous examples are computed, in order to demonstrate the wide field of application of the integral equation method. The accuracy of the method is determined by comparing the computed values with experimental results or with the results of other methods.

N80-14820/8 PC **A05**/MF **A01**
European Space Agency, Paris (France).
Solution of Electromagnetic Boundary Value Problems of Complicated Structures. Theory of the Integral Equation Method.
V. Stein. May 79, 93p ESA-TT-596, DFVLR-FB-78-01
Tran-Transl. into English of 'Loesung Elektromagnetischer Bandwertprobleme bei Komplizierten Struckturen. Grundlagen der Integralgleichungsmethode', Dfvlr, Oberpfaffenhofen, (Germany, F.R.) Report Dfvlr-FB-78-01, 26 Jan. 1978. Misc-Original Report in German Previously Announced as N79-16184. Misc-Orignal German Report Available from Dfvlr, Cologne Dm 30,40.

The theory for the determination of the radiation and scattering behavior of complicated structures with the aid of the integral equation method was studied. These structures may be complicated isolated radiators or shapes like helicopters or satellites, which are excited by an electromagnetic wave. The objective of the integral equation method is the determination of the surface currents, from which all electromagnetic parameters may be computed. For this reason two independent integral equations for the electric and magnetic field are derived from the vector wave equations by means of the second Greens' theorem. The field of application of these two equations is discussed in detail.

N80-14821/6 PC **A06**/MF **A01**
European Space Agency, Paris (France).
Numerical Solution of the Electric and Magnetic Field Integral Equations.
V. Stein. May 79, 102p ESA-TT-597, DFVLR-FB-78-05
Tran-Transl. into English of 'Numerische Loesung der Integralgleichungen fuer das Elektrische und Magnetische Feld', Dfvlr, Oberpfaffenhofen, (Germany, F.R.) Report Dfvlr-FB-78-05, 16 June 1978. Misc-Original German Report Available from Dfvlr, Cologne Dm 34,60.

The currents on the surface of a structure, excited by an electromagnetic wave, are determined by numerical solution of an integral equation for the electric or magnetic field. The integral equation is converted into a linear system of equations with the aid of the method of moments. This system of equations is also obtained by applying the reaction concept. Both methods are treated in detail. Mathematical models for the surface as well as some special numerical procedures are described extensively. Special attention is paid to the problem of minimizing computer storage space and computation time.

PB80-124597 (Order as PB80-124548, PC **A05**/MF **A01**)
Wayne State Univ., Detroit, MI. Dept. of Physics.
A Class of Double Integrals Involving Gaussian and Trigonometry Factors,
D. M. Fradkin. 16 Apr 79, 8p
Included in Jnl. of Research of the National Bureau of Standards, v84 n4 p319-326, Jul-Aug 79.

The five-parameter double integral (integral from 0 to infinity of exp(-(py)squared)sine(beta y + theta)dy)(integral from 0 to y of exp(-x squared)cosine(epsilon beta x + phi)dx) is evaluated in terms of Fourier transforms of exp(-x squared)erfc(alpha x). Some new expressions for these transforms are obtained. The five parameter definite double integral considered in this paper is a generalization of that encountered in describing the radiation reaction effects on a charged particle swept over by a single plane laser pulse.

20D. Fluid Mechanics

AD-A078 382/9 PC **A02/MF A01**
Rensselaer Polytechnic Inst Troy NY Dept of Mathematical Sciences
The Stability of Viscous Flow between Rotating Concentric Cylinders with an Axial Flow.
Technical rept.,
R. C. DiPrima, and A. Pridor. 21 Dec 78, 20p
Contract N00014-76-C-0187
Pub. in Proceedings of the Royal Society of London, v366A p555-573 1979.

No abstract available.

AD-A078 423/1 PC **A18/MF A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD
An Inventory of Some Force Producers for Use in Marine Vehicle Control.
Research and development rept.,
Michael B. Wilson, and Christian von Kerczek.
Nov 79, 410p Rept no. DTNSRDC-79/097

This report is a collection of information about the force-producing capabilities and characteristics of some hydrodynamic devices that could possibly be used for the control of submarine or surface ships. Emphasis is on the variety of concepts available for this purpose, something about the physical nature of how each device operates, and descriptions of the forces attainable. Out of all the devices considered, a preliminary judgment is formed of those devices that seem most likely to be of use in the immediate future. (Author)

AD-A078 484/3 PC **A04/MF A01**
California State Univ Long Beach Dept of Mechanical Engineering
The Calculation of Momentum and Heat Transfer in Internal Flows and in Flows with Small Regions of Separation.
Final technical rept. Jan-Dec 78,
Tuncer Cebeci. Dec 78, 71p ONR-CR297-002-1
Contract N00014-77-C-0073

Numerical methods for solving boundary-layer equations are discussed and the application of the Box scheme to internal flows and to small regions of separated flow is decribed in detail. The Box scheme has previously been used with considerable success to solve a wide range of external two- and three-dimensional flows and is shown here to be equally successful when applied in internal and separated flows which require its use in an inverse manner. A nonlinear eigenvalue and a Mechul method are described: the former is simpler to use and is recommended for internal flow problems; the latter is more appropriate for calculations in and through small regions of separated flow. Turbulent flow is characterized by eddy-viscosity and eddy-conductivity assumptions which are shown to represent the mean-flow and heat-transfer properties, including transition, provided the location of the onset of transition is known. (Author)

AD-A078 768/9 PC **A02/MF A01**
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Engineering Science and Mechanics
'A Second-Order Asymptotic Solution for the Laminar Separation of Supersonic Flows Past Compression Ramps,'
S. A. Ragab, and A. H. Nayfeh. Jul 78, 15p
Contract N00014-75-C-0381
Pub. in AIAA Fluid and Plasma Dynamics Conference (11th), held in Seattle, Washington, 10-12 Jul 78. p1-12 1978.

No abstract available.

AD-A078 917/2 PC **A03/MF A01**
Naval Research Lab Washington DC
Gas Channel Formation: Dependence of Hydrodynamic Phenomena on the Initial Radial Pressure Profile.
Memorandum rept.,
Martin Lampe, and Selig Kainer. 30 Nov 79, 27p
Rept no. NRL-MR-4129

The hydrodynamic processes resulting from 'instantaneous' heating of a cylindrical region of gas are studied by means of numerical integration of the fluid equations. Various initial overpressures and radial profiles of initial pressure are considered. For very smooth radial profiles, e.g. the Bennett profile, the evolution is very simple: the gas expands radially, a single outgoing shock forms, the density at late times undershoots the value at pressure balance by only about 10% and then increases to pressure balance slowly, monotonically, and adiabatically. For profiles that are more square in shape, or are sharply discontinuous, the evolution is much more complicated. A strong rarefaction typically occurs, of brief duration and in a narrow region about the axis. During the rarefaction, both the density and temperature fall well below the values at pressure balance. The rarefaction is abruptly terminated by an inward-propagating shock, followed by multiple density oscillations, which can form shocks for strong overpressures. The dependence of the time scales and strengths of the rarefactions and shocks on the initial overpressure and profile shape are calculated and discussed.

AD-A078 952/9 PC **A12/MF A01**
University of Southern California Los Angeles Dept of Aerospace Engineering
On the Feedback Phenomenon of an Impinging Jet.
Interim rept. Apr 77-Sep 79,
Nagy Sabet M. Nosseir, and Chih-Ming Ho. Sep 79, 257p AFOSR-TR-79-1263
Contract F49620-78-C-0060

The resonance phenomenon which occurs when a high speed turbulent jet impinges on a large flat plate is experimentally studied. The far field noise is also investigated for a wide range of impinging jet speeds. The study involves far field, near field, and surface pressure measurements. A feedback of pressure waves between the nozzle and the plate is found to be the mechanism responsible for the resonance. The feedback loop is formed by downstream traveling large coherent structures, and upstream acoustic waves propagating in the nearby stagnant region around the jet. The upstream acoustic waves are generated by the impingement of large scale structures on the plate. Near the nozzle exit these waves are locked in phase with the oscillations of the thin shear layer, which is forced to roll into large eddies at the resonance frequency f(r). Furthermore, the experimental data revealed the following interesting results: (1) The total period of the feedback loop is an integer N times the resonance period, N being constant over a resonance frequency stage. A jump from one frequency stage to another (occurring at certain nozzle-to-plate separation distances), takes place through a quantum unit change in N, so as to preserve the phase lock between the two oscillations at the nozzle. (2) As the wavy shear layer evolves into large vortices, a strong interaction develops among the initial instability vortices. This phenomenon is referred to as 'collective interaction', and is believed to be the mechanism responsible for the sharp drop in the passage frequency of the vortices near the nozzle exit. The frequency drops from the high instability frequency f(in) to that of the resonance frequencey f(r).

N80-14354/8 PC **A09/MF A01**
Lockheed Missiles and Space Co., Huntsville, AL. Research and Engineering Center.
GIM Code User's Manual for the Star-100 Computer.
Final Report.
L. Spradley, and M. Pearson. Nov 79, 197p
NASA-CR-3157, LMSC-HREC-0566850
Contract NAS1-15341

The General Interpolants Method (GIM), a three dimensional, time dependent, hybrid procedure for generating numerical analogs of the conversion laws, is described. The Navier-Stokes equations written for an Eulerian system are considered. The conversion of the GIM code to the STAR-100 computer, and the implementation of 'GIM-ON-STAR' is discussed.

N80-14356/3 PC **A06/MF A01**
Scientific Research Associates, Inc., Glastonbury, CT.
Development of a Three-Dimensional Supersonic Inlet Flow Analysis.
Final Report.
R. C. Buggeln, H. Mcdonald, R. Levy, and J. P. Kreskovsky. Jan 80, 122p NASA-CR-3218
Contract NAS3-21003

A method for computing three dimensional flow in supersonic inlets is described. An approximate set of governing equations is given for viscous flows which have a primary flow direction. The governing equations are written in general orthogonal coordinates. These equations are modified in the subsonic region of the flow to prevent the phenomenon of branching. Results are presented for the two sample cases: a Mach number equals 2.5 flow in a square duct, and a Mach number equals 3.0 flow in a research jet engine inlet. In the latter case the computed results are compared with the experimental data. A users' manual is included.

N80-14357/1 PC **A06/MF A01**
Illinois Inst. of Tech., Chicago.
On the Question of Instabilities Upstream of Cylindrical Bodies.
Final Report, 15 Nov. 1974 - 30 Apr. 1977.
M. V. Morkovin. Dec 79, 113p NASA-CR-3231, R79-3
Grant NSG-1120

In an attempt to understand the unsteady vortical phenomena in perturbed stagnation regions of cylindrical bodies, a critical review of the theoretical and experimental evidence was made. Current theory is revealed to be incomplete, incorrect, or inapplicable to the phenomena observed experimentally. The formalistic approach via the principle of exchange of instabilities should most likely be replaced by a forced-disturbance approach. Also, many false conclusions were reached by ignoring that treatment of the base and perturbed flows in Hiemenz coordinate eta is asymptotic in nature. Almost surely the techniques of matched asymptotic expansions are expected to be used to capture correctly the diffusive and vorticity amplifying processes of the disturbances regarding the mean-flow boundary layer and outer potential field as eta and y/diameter approach infinity. The serious uncertainties in the experiments are discussed in detail.

N80-14360/5 PC **A02/MF A01**
Royal Aircraft Establishment, Farnborough (England).
The Calculation of Inviscid Separated Flow About a Slender Cone for Large Angles of Attack.
S. B. Zacharov. May 79, 13p RAE-TR-2009
Tran-Transl. Into English from Uch. Zap. Tsagi (USSR), V. 7, No. 6, 1976 13 p.

The symmetrical, separated flow about a circular cone was calculated using slender body theory. The configuration of vortex layers, the coefficients of the normal force, and the pressure distribution are determined.

N80-14366/2 PC **A06/MF A01**
Max-Planck-Inst. fuer Stroemungsforschung, Goettingen (Germany, F.R.).
Investigation of Coherent Structures in the Velocity Field of a Fully Developed Turbulent Channel Flow Using Flow Visualization and Anemometry.
M. Hofbauer. 1978, 103p MPIS-MITT-66, ISSN-0374-1257
Text in German; English Summary.

Coherent structures observed in oil channel flow test are investigated. The Reynolds number, 8050, was based on the channel width and the mean center line velocity. A one to one correspondence of structures in the time signals of u and v as well as of visually recognized structures of the flow field, was found by simultaneously performing hot film measurements and taking pictures with a film camera. Due to the high spatial resolution in the oil channel it was possible to detect the cause of the

lift up of the low speed streaks and to show that before the lift up there were no vortices. The Tollmien-Schlichting frequencies were seen in the power spectra of v. This supported Landahl's model of turbulence. A dualistic view of turbulent motions determined from the results is discussed.

N80-14367/0 PC **A07**/MF **A01**
Max-Planck-Inst. fuer Stroemungsforschung, Goettingen (Germany, F.R.).
Experiments to Show the Existence of the Liquefaction Shock Wave in Retrograde Gases.
G. Dettleff. 1978, 129p MPIS-MITT-67, ISSN-0374-1257
Text in German; English Summary.

The existence of the liquefaction shock wave in retrograde gases is investigated. Retrograde gases are characterized by a particular condensation behavior, are liquefied by means of isentropic compression and, under restricted conditions, by means of shock compression. The production of liquid by means of shock compression is proven by establishing the thermodynamic state. The pressure, the temperature, and the density are measured as is the velocity of the liquefaction shock wave. By means of photographs, a great number of ring shaped objects behind the liquefaction shock wave were observed. Their properties, such as size, growth, and lifetime were investigated. Possible interpretations of the ring shaped objects as bubbles, driplets, or ring vortices are discussed.

N80-14369/6 PC **A03**/MF **A01**
Max-Planck-Inst. fuer Stroemungsforschung, Goettingen (Germany, F.R.).
Wall Pressure Fluctuations Generated by a Pair of Vortices Wanddruckschwankungen Erzeugt durch Ein Wirbelpaar.
W. Moehring, and Feb 79, 35p MPIS-6/1979
Text in German; English Summary.

The wall pressure field generated by two potential vortices of equal circulation situated in the vicinity of a flat wall is calculated. This configuration is regarded as a strongly simplified flow model of the mutual influence between vortices and walls. Two different types of flow fields are distinguished. Either the vortices remain together, or one of them overtakes the other and separates from it increasingly. It is found that although the far field generated by two adjacent vortices is similiar to the velocity field of a single vortex of twice the circulation, the pressure field is quite different.

N80-14370/4 PC **A03**/MF **A01**
Centre National de la Recherche Scientifique, Meudon-Bellevue (France). Lab. d'Aerothermique.
Stability of a Flat Wall Jet Stabilite d'UN Jet Parietal Plan.
D. Durox, and M. F. Scibilia. Feb 79, 32p REPT-79-5, PUBL-597
Language in French.

A theoretical computation of plane wall jet stability is presented. The Galerkin method was applied to the Orr-Sommerfeld equation to establish the stability conditions. Computations were made using double precision FORTRAN language on an IBM 360/138 computer. The precision of the results is sufficient for a first approach to the instability critical point determination. The numerical values obtained in several examples are given and compared to those obtained by other methods.

20E. Masers and Lasers

AD-A078 297/9 PC **A04**/MF **A01**
Bell Aerospace Textron Buffalo NY
Numerical Model Development for Laser Cavity Flowfields.
Interim rept. 31 May 78-31 May 79,
J. T. Schimke. 1979, 64p 9278-950002 , AFOSR-TR-79-1239
Contract F49620-77-C-0076

A recently developed subroutine package for the integration of systems of ordinary differential equations by implicit methods is tested on a variety of gas dynamic problems. These problems include one-dimensional unsteady gas flow with chemistry and radiation and two and three-dimensional parabolic (steady) Navier-Stokes problems. The governing partial differential equations were converted to systems of ordinary differential equations using either finite differences or finite elements, and then integrated by the implicit integration package. (Author)

AD-A078 485/0 PC **A06**/MF **A01**
Illinois Univ At Urbana-Champaign Dept of Aeronautical and Astronautical Engineering
An Efficient Rotational Nonequilibrium Model of a CW Chemical Laser.
Final rept. 15 May 78-14 May 79,
Lee H. Sentman, and Warren Brandkamp. Jul 79, 114p AAE-TR-79-5, UILU-ENG-79-0505, AFOSR-TR-79-1234
Grant AFOSR-78-3669
Prepared in cooperation with Bell Aerospace Textron.

An efficient rotational nonequilibrium model of a cw chemical laser was developed. The essential elements of the model and their influence on laser performance were shown by detailed comparison with a model which contains boundary layer flow striations, F atom wall recombination and detailed, finite rate kinetics (typically 21 species and 143 reactions). Rotational equilibrium and nonequilibrium species profiles, saturated gains, intensity distributions and power spectral distributions were compared for several cases. The rotational nonequilibrium model was coupled to a physical optics strip resonator code. (Author)

AD-A078 519/6 PC **A06**/MF **A01**
Southern Methodist Univ Dallas TX
Design of Injection Lasers for Improved Radiation Performance.
Final rept. 23 Feb 76-22 Feb 79,
Jerome K. Butler. 14 Nov 79, 109p ARO-13568.9-EL
Grant DAAG29-76-G-0146

This research was concerned with (1) the electromagnetic modes and (2) the radiation pattern characteristics of contemporary injection laser structures. The objective was to investigate laser structures which can produce stable-beam radiation patterns. The control of lateral fields in lasers has been accomplished with many novel devices such as the channeled-substrate-planar, buried heterostructure and strip-loaded waveguide. The drawback to the stripe laser is that it is laterally unstable. Much of our work has been aimed at rigorously modeling the electromagnetic modes of stripe lasers. We have also applied our analysis to other lasers such as the channeled-substrate-planar device. (Author)

AD-A078 603/8 PC **A03**/MF **A01**
Army Electronics Research and Development Command Fort Monmouth NJ Night Vision and Electro-Optics Labs
Development of the Neodymium Pentaphosphate (NPP) Laser.
Final technical rept.,
J. Gualtieri. Oct 79, 49p Rept no. DELNV-TR-79-5

The structural properties of NPP are examined and the effect of twin domain boundaries on light propagation are discussed. Spectroscopic properties of NPP and other lanthanide pentaphosphates are outlined. The advantages of NPP as a laser material for miniature rangefinder and long distance fiber optic application are discussed. Laser and device considerations are reviewed and a miniature NPP laser cavity with all components individually removable for easy replacement (overall size 1.5 by 1.5 by 4.4 cm) are discussed. (Author)

AD-A078 919/8 PC **A11**/MF **A01**
Rockwell International Canoga Park CA Rocketdyne Div
Chemically Pumped Iodine Laser.
Final rept.,
S. Hurlock, H. Laeger, and R. Wagner. Sep 79, 232p AFWL-TR-79-52, AD-E200 427
Contract F29601-78-C-0023

The production of O2(1 delta) by the reaction of chlorine fluorosulfate (CFS) vapor and chlorine gas with concentrated basic hydrogen peroxide solutions was studied under conditions of controlled contact area, contact time, and temperature. Variables were temperature, CFS and C1(-2) flowrates, liquid flowrates, and liquid concentrations. Effluent flow, O(-2) flow, and O2(1 delta)/O2 were measured. O2(1 delta) yields with the CFS were lower than with C1(-2) due to quenching. O(-2) production was about the same, governed primarily by contact time, liquid flow and temperature. Qualitative quenching experiments identified serious quenchers present in the CFS system.

AD-A078 974/3 PC **A05**/MF **A01**
Avco Everett Research Lab Inc Everett MA
Investigation of Optimum Laser Pumping.
Final technical rept. 15 Aug 74-31 Jul 79,
J. H. Jacob, R. Brochu, A. Hawryluk, J. Hsia, and M. Rokni. Nov 79, 95p
Contract N00014-75-C-0062, DARPA Order-3500

The objective of this program is to characterize the performance of various laser candidate systems so that reliable projections of their usefulness for long-range DARPA missions can be properly assessed. This final report highlights the accomplishments attained under this contract and summarize those results obtained in the interium period since the last Semi-Annual Technical Report. These include: (1) an attachment rate constant determination for the reaction e plus Cl2, (2) kinetic quenching measurements and role of the B- and C- states in XeF*, (3) some preliminary results on active medium absorption in XeF* laser mixtures, (4) the effect of the ground state population on the XeF laser performance; and (5) a detailed model of e-beam pumped KrF* laser. (Author)

20F. Optics

AD-A078 296/1 PC **A06**/MF **A01**
Catholic Univ of America Washington DC Vitreous State Lab
Development of High Strength Optical Fiber Waveguides Using Residual Surface Compression.
Final technical rept. Jan 77-May 79,
R. K. Mohr, O. H. El-Bayoumi, N. Lagakos, H. Hojaji, and P. Klocek. Oct 79, 117p RADC-TR-79-252
Contract F19628-77-C-0084, ARPA Order-3282

The primary objective of this project was to maximize the compressive strengthening obtained in low loss fibers made by the molecular stuffing process. The process being the doping of a porous high silica glass rod made by a phase separation and leaching process. The rod is subsequently sintered to form a solid glass preform form which fibers may be drawn. The ultimate goal being a fiber having greater than 100 ksi surface compression and loss less than 10 dB/km. As a major part of this effort we have characterized the strengthening effects of compression and demonstrated that even moderate compression can be of value in many applications. Optical losses less than 10 dB/km are obtainable using molecular stuffing and we were able to produce preforms having greater than 75 ksi compression. Preforms and fibers having very high compression are difficult to produce and thus may not provide a practical method of dramatically increasing fiber strength. Surface compression on the order of 30 ksi is relatively easy to obtain, however, and compression of this magnitude can have significant effects on fatigue failure in many applications. We were able to demonstrate that fibers having surface compression showed no strength degradation when aged under load in air as long as the tensile load was less in magnitude than that of the compression. In fact, the strength of abraded samples was observed to improve with time.

AD-A078 862/0 PC **A04**/MF **A01**
Naval Research Lab Washington DC
Fractographic Analysis of Optical Fibers.
Interim technical rept.,
J. J. Mecholsky, S. W. Freiman, and S. M. Morey. Nov 77, 53p Rept no. TR-1
DARPA Order-3285

The fracture surfaces of over 50 fibers tested at Hughes or ITT Reasearch Laboratories were examined on the scanning electron microscope (SEM). The sources of failure in these fibers were determined to be either mechanically induced sharp cracks, cracks resulting from inclusions or foreign particles, bubbles or inclusions. It was sug-

gested that many of these sources of failure can be eliminated by changing production procedures. For example, some larger inclusions can be eliminated by using synthetic, high grade silica, starting material. Another example for eliminating low strength defects is by using high quality silica tubing in the CVD process. The fracture surface demarcations known in glass as mirror, mist, hackle, and crack branching were identified and related to the stress, at failure. In all cases but one, fracture surface analysis agreed with measured stresses during testing within experimental accuracy. Thus, fractography can be used to determine the stress and source of unexpected service failures.

N80-14900/8 PC **A02/MF A01**
Arkansas Univ., Fayetteville. Dept. of Physics.
Scalable Standard Optical Sources in the VUV: Emissions from Electron Impact on Metals.
Final Report.
R. Hughes. Jan 80, 12p NASA-CR-162562
Grant NSG-7106

The use of electron impact on metals in the development of a compact optical standard lamp in the vacuum ultraviolet is described. Two different mechanisms are exploited, transition radiation and bremsstrahlung. Transition radiation will be used as a primary standard from 1200A to 3000A using 10 keV electron impact on tungsten. Bremsstrahlung will be used in the soft X-ray region below 1200A to less than 5A as an optical transfer standard from 4 keV electron impact on tantalum or tungsten.

N80-15005/5 PC **A02/MF A01**
Observatoire de Paris-Meudon (France).
The High Spatial Resolution of Interferometry in the Near Infrared la Haute Resolution Spatiale Par Interferometrie dans la Proche Infrarouge.
P. Lena. 1979, 19p
Subm-Submitted for Publication. Conf-Presented at Colloq. De Bordeaux, 6-8 Mar. 1979. Text in French; English Summary.

Methods of restoring spatial coherence in the wave front, partly destroyed by the turbulent state of the earth atmosphere, are reviewed. A first approach called speckle interferometry which provides the spectral density of several objects such as protostars or stars with extended envelopes, is described. This method achieves high sensitivity and short integration and provides a good frequency coverage of the object. The second approach is Michelson interferometry or aperture synthesis. It may be carried out either with broadband incoherent detection (white light), or with a narrow band (heterodyne). A comparison in terms of merit factor versus wavelength is given.

PAT-APPL-6-068 822 PC **A02/MF A01**
Department of the Air Force Washington DC
Optical Multiplexer/Demultiplexer.
Patent Application,
C. R. Husbands. Filed 22 Aug 79, 17p AD-D006 760/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An optical multiplexer/demulitplexer has a body made up of a pair of reflective and a pair of nonreflective sides. As a demultiplexer a beam containing a plurality of optical wavelengths is separated within the body into its constituent wavelengths utilizing the principles of optical refraction and optical reflection. By extending the length of the body, sufficient physical separation can be realized between each of the constituent wavelengths to allow detection of each wavelength by spacially separated detectors. As a multiplexer a plurality of beams, each having a single wavelength, are combined to provide a single output beam having a plurality of wavelengths contained therein. (Author)

PAT-APPL-6-073 477 PC **A02/MF A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Scanning Afocal Laser Velocimeter Projection Lens System.
Patent Application,
D. B. Rhodes. Filed 7 Sep 79, 10p N80-12866/3, NASA-CASE-LAR-12328-1

This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method and apparatus for projecting and focusing parallel laser light beams from a laser Doppler velocimeter on a target area is presented. The system which includes three lenses is described. Two lenses work together as a fixed afocal lens combination. The third lens is a movable scanning lens. Parallel laser beams travel from the velocimeter through the scanning lens and through the afocal lens combination and converge. The constant focal volume and crossbeam angle which are maintained during the scan are discussed.

PATENT-4 174 524 Not available NTIS
Department of the Navy Washington DC
Ultra High Speed Gated Pulse Optical Imaging System.
Patent,
Steven E. Moran. Filed 25 Sep 78, patented 13 Nov 79, 8p AD-D006 776/9, PAT-APPL-945 721
Supersedes PAT-APPL-945 721-78, AD-D005 517.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Apparatus for overcoming the effects of back scatter and forward scatter in viewing an object through a diffusive medium includes a projector for projecting successive picosecond coherent light pulses through the medium to the object, and also includes a light receiving element for receiving light transmitted through the medium. An optical shutter is positioned in relation to the receiving element for selectively admitting light thereto. An optical path between the source and the shutter couples light of a projected pulse to open the shutter for a picosecond at a selected interval after the pulse has been projected, in order to admit light of the pulse reflected from the object to the receiving means. Structure cooperates with the receiving element to provide sets of light responsive signals, each set representing an image of light reflective surfaces of the object which are included in one of one or more discrete viewing spaces, a display being provided for combining all of the represented images to provide an image of the object. (Author)

PATENT-4 179 190 Not available NTIS
Department of the Air Force Washington DC
Wide Band Adjustable Brewster Angle Polarizer.
Patent,
Jerome D. Friedman, and Carl A. Pitha. Filed 3 Jan 78, patented 18 Dec 79, 5p AD-D006 793/4, PAT-APPL-866 742
Supersedes PAT-APPL-866 742-78, AD-D004 693.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A wide band adjustable Brewster angle polarizer has a pair of dielectric elements adjustably mounted within a housing. A dial micrometer is operably attached to the means for adjusting the angular relationship between the normal to the dielectric material and an incoming beam of unpolarized light. The micrometer is calibrated in direct relationship between the wavelength of the incoming beam of light and the establishment of a Brewster angle between normal to the dielectric material and the incoming beam. Thereby, by proper selection of the dielectric material, light ranging from the ultraviolet to the infrared range of the optical spectrum can be quickly and reliably polarized. (Author)

20G. Particle Accelerators

PAT-APPL-940 970 PC **A02/MF A01**
National Aeronautics and Space Administration. Pasadena Office, CA.
Miniature Cyclotron Resonance Ion Source Using Small Permanent Magnet.
Patent Application,
V. G. Anicich, and W. T. Huntress. Filed 11 Sep 78, 13p N80-12851/5, NASA-CASE-NPO-14324-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An ion source using the cyclotron resonance principle is presented. A miniaturized ion source device in an air gap of a small permanent magnet with a substantially uniform field in the air gap of about 0.5 inches is described. The device and permanent magnet are placed in an enclosure which is maintained at ε high vacuum into which a sample gas is introduced. A discussion of how the invention avoids the problem of getting the ion beam coupled into the utilization system is presented.

20I. Plasma Physics

AD-A078 515/4 PC **A03/MF A01**
North Carolina State Univ Raleigh Dept of Physics
Intense Relativistic Electron Beam Investigations.
Final rept. 1 Jul 76-30 Apr 79,
Wesley O. Doggett. 30 Apr 79, 50p AFOSR-TR-79-1310
Contract F49620-76-C-0007

During this period research was performed at North Carolina State on collective ion acceleration in a vacuum diode geometry and in collaboration with a group from the Naval Research Lab on collective ion acceleration within an evacuated dielectric tube. Diode voltage and current wave forms along with transmitted beam energy and current were measured for a series of linear diameters and lengths. Beam energy loss was linear at the rate of approx 12 J/cm. For the 8.3 and 15.9 cm length tubes, the Alfen limiting current was exceeded, indicating the creator of enough plasma for some current neutralization. Below the Alfen limit the current propagates in a pinched beam. The beam from velocity was 1.4 cm/nsec. Equipment for experimental work on electron beam propagation in evacuated magnetized pipes has been assembled and a theoretical study was made of intense electron beam equilibrium in magnetized pipes using a relativistic cold fluid model. (Author)

AD-A078 684/8 PC **A04/MF A01**
Michigan Univ Ann Arbor Coll of Engineering
Theoretical Studies of Laser Light Interaction and Optical and X-Ray Emission from Dense Metallic Plasmas.
Final rept. 1 Aug 75-1 Oct 79,
J. J. Duderstadt, and R. S. B. Ong. Nov 79, 54p AFOSR-TR-79-1303
Grant AFOSR-76-2904

The interaction of a high power CO2 laser with a dense plasma is investigated. Stimulated Brillouin scattering and thermal self-focusing of the incident beam is studied. The dynamics of a strongly turbulent plasma generated by laser-plasma interaction, and the behavior of nonlinear waves (solitons) in the plasma is analyzed. Advanced MHD plasma simulation models are employed to study the complex dynamics of nonequilibrium plasmas interacting with laser radiation. MHD computer codes capable of simulating exploding wire or pinch dynamics subjected to intense laser irradiation are developed. Radiation transport effects, such as X-ray line emission and re-absorption in optically thick regions of the plasma, are incorporated in the MHD computer code. (Author)

AD-A078 894/3 PC **A03/MF A01**
Texas Tech Univ Lubbock Laser Lab
Studies of Transient Discharges.
Annual rept. no. 2, 15 Jun 78-14 Jun 79,
P. F. Williams, and M. A. Gundersen. 1 Oct 79, 29p AFOSR-TR-79-1304
Contract F49620-79-C-0118

Progress during the time period June 15, 1978 through June 14, 1979 in our program to study the basic physical processes responsible for laser-induced breakdown of spark gaps is reported. Major accomplishments during the period include (1) the measurement of temporally and spatially resolved electron densities during and after the arc phase, (2) the study of the initial buildup of charge and current in these gaps, and (3) improvements in the data acquisition equipment used in the work. Evidence of a shock front seen in the electron density data was obtained. (Author)

N80-14910/7 PC **A03/MF A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.

Inverse Method for the Mixed Nonlinear Schroedinger Equation and Soliton Solutions.
T. Kawata, J. Sakai, and N. Kobayashi. Sep 79, 35p IPPJ-417

A mixed nonlinear Schroedinger equation which has a usual cubic nonlinear term and a derivative cubic nonlinear term is exactly solved by the inverse scattering method under the nonvanishing boundary condition. The N-soliton solution is obtained and we find that the one-soliton solution generally pulsates but becomes stationary and further algebraic in some special cases. Both limiting cases corresponding to the nonlinear Schroedinger equation and the derivative nonlinear Schroedinger equation are made clear. This problem is applied to solve the Alfven wave, propagating parallel to the magnetic field, under the plane wave boundary condition. A peculiar structure of spiky modulation is shown analytically.

N80-14911/5 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Ion Heating by the Current-Driven Turbulence in an Inhomogeneous Plasma.
K. Matsunaga. Oct 79, 35p IPPJ-423

Basic experiments of turbulent heating are performed in a non-isothermal and inhomogeneous plasma. A high frequency drift wave (HFDW) is excited by the parallel electron current. From detailed measurements of the ion energy distribution, it is found that ions are heated isotropically and nonlocally. The ion heating is always accompanied with the large amplitude HFDW turbulence. The ion heating rate can be well explained by the semi-phenomenological quasi-linear stochastic heating theory.

N80-14912/3 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Post Collision Interaction in Photoexcited Argon LMM Auger Processes.
H. Hanashiro, Y. Suzuki, A. Mikuni, T. Sasaki, and T. Takayanagi. Sep 79, 13p IPPJ-422

The L(2),(3)M(23)M(23) Auger-electron spectra of argon produced by photoionization were studied. The range of photon energy is from 249 eV, just above the L(3) edge, to 270 eV. The closer the photon energy is to the threshold, the more conspicuously is the post-collision interaction observed as a shift of the peak and asymmetric profile in each Auger line. The observed dependence of the energy shift upon the kinetic energy of the photoelectron is compared with the semi-classical theory after Niehaus, and the mean lifetime for Auger decay of the inner-shell hole is deduced to be 2.4 x 10 to the -14th power sec.

N80-14914/9 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Stability of High Density Plasma in a Multiple Mirror.
M. Inutake, A. Komori, R. Hatakeyama, and N. Sato. Jul 79, 6p IPPJ-418

Confinement and stability for a low beta plasma in a multiple mirror were investigated by using Q machines. Measurements were also made on gun produced and theta pinch plasmas with high beta value. Characteristic behaviors of low frequency plasma instabilities are discussed using a quasi steady, high density, helium plasma.

N80-14915/6 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Investigation of Molybdenum Impurity Diffusion During Hydrogen Gas Puffing in JIPP T-11 Plasma.
M. Sato, R. Sugihara, and K. Miyamoto. Oct 79, 28p IPPJ-412

In JIPP T-2 Tokamak plasma, a decrease of molybdenum density in the plasma center was observed by soft X-ray measurement during the strong gas puffing. A model based on the neoclassical concept in the Pfirsch-Schloeter regime is presented to explain the decrement. The model indicates that the combination of a decrement of inward flux in the plasma center region and an increment of outward flux causes the decrement of the central molybdenum ion density.

N80-14916/4 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Dept. of Electrical Engineering.

Nonlinear Shift of Resonance Velocity in Interactions Between Particles and Plasma Cyclotron Waves.
K. Ido. Sep 79, 14p IPPJ-421

Two types of wave-particle interactions are clarified in finite-amplitude cyclotron waves (whistler, electron cyclotron, and ion cyclotron waves). Further, the wave nonlinearity was found to cause the shift of cyclotron resonance velocity from the linear value, (omega - Omega sub o) /K, where Omega sub o denotes the cyclotron frequency. The effect of this shift on the wave propagation is suggested.

N80-14918/0 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Super-Banana Limiter as a Possible Edge Cooling Scheme.
K. Ikuta, and M. Okamoto. Nov 79, 11p IPPJ-425

An edge cooling scheme is proposed where energetic impurity atoms are injected into the plasma periphery in which the ripple of toroidal field is vertically asymmetric. By the asymmetric ripple, the injected impurity ion forms a super-banana which drifts outward to the wall, enhancing the radiation cooling in the plasma periphery without impurity accumulation. The impurity beam is thus called a super-banana limiter.

N80-14919/8 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Behaviour of Laser-Produced Plasma in a Uniform Magnetic Field: Plasma Instabilities.
S. Okada, K. Sato, and T. Sekiguchi. Nov 79, 34p IPPJ-424

The production of a column of a laser produced plasma successfully made in a uniform magnetic field is described. The radius of the column increases and then decreases. On the surface of this plasma column, where the steep density gradient exists with the scale length shorter than the ion Larmor radius, an azimuthal modulation appears in the plasma luminosity. This is indicative of the flute like instability with the azimuthal wave number. The dispersion equation based on the linearized Vlasov equation with the local approximation is derived and the occurrence of the lower hybrid drift instability is predicted.

N80-14921/4 PC **A06**/MF **A01**
United Technologies Research Center, East Hartford, CT.
High Temperature UF6 RF Plasma Experiments Applicable to Uranium Plasma Core Reactors.
W. C. Roman. Oct 79, 101p NASA-CR-159159
Contract NAS1-14329

An investigation was conducted using a 1.2 MW RF induction heater facility to aid in developing the technology necessary for designing a self critical fissioning uranium plasma core reactor. Pure, high temperature uranium hexafluoride (UF6) was injected into an argon fluid mechanically confined, steady state, RF heated plasma while employing different exhaust systems and diagnostic techniques to simulate and investigate some potential characteristics of uranium plasma core nuclear reactors. The development of techniques and equipment for fluid mechanical confinement of RF heated uranium plasmas with a high density of uranium vapor within the plasma, while simultaneously minimizing deposition of uranium and uranium compounds on the test chamber peripheral wall, endwall surfaces, and primary exhaust ducts, is discussed. The material tests and handling techniques suitable for use with high temperature, high pressure, gaseous UF6 are described and the development of complementary diagnostic instrumentation and measurement techniques to characterize the uranium plasma, effluent exhaust gases, and residue deposited on the test chamber and exhaust system components is reported.

N80-14922/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Effect of Velocity Overshoot on the Performance of Magnetohydrodynamic Subsonic Diffusers.
M. S. Greywall, and J. M. Smith. 1980, 10p
NASA-TM-79305, DOE/NASA/2674-79/8
Contract EF-77-A-01-2674
Conf-Presented at Aerospace Sci. Meeting, Pasadena, Calif., 14-16 Jan. 1980; Sponsored by Aiaa.

The evolution of an overshoot velocity distribution was studied in a plane two dimensional diffuser as a function of diffuser divergence angle. The diffuser performance for velocity overshoot was compared to that for a fully developed inlet velocity profile. Results indicate that the ratio of peak-to-center line velocity increases along the diffuser for a diffuser half angle greater than some critical value. It was also found that irrespective of the accompanying inlet temperature distribution, the wall shear stress and the wall heat flux is substantially larger when the inlet velocity profile has an overshoot than that for a fully developed inlet velocity profile.

N80-14923/0 PC **A05**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Physics.
Interaction of High Voltage Surfaces with the Space Plasma.
Annual Report.
H. R. Kaufman, and R. S. Robinson. May 79, 81p
NASA-CR-159731
Grant NSG-3196

Tests were conducted using plasma densities of approximately 10 to the 5th power - 10 to the 6th power/cu cm. Insulating materials tested were polyimide (Dapton), mica and glass. Surface-area effects were found to be substantially reduced from those previously reported at lower plasma densities. The difference in typical plasma density was felt to be the major cause of this change, although a saturation effect may also be involved. At the 10 to the 5th power/cu cm plasma density range, surface effects on collection current appear limited to roughly 1 cm from the hole. A factor of several reduction of collected current was obtained with both surface scribing and a 2 x 2 cm conducting mesh. It appears possible that the effects of surface treatment might be more significant at lower plasma densities. Effects of repeated tests were also noted, with current collection decreasing with successive tests. Depending on the materials involved, the effect appeared due to either the smoothing of the inside of the insulator hole or the sputtering of insulator on the exposed conductor. A general conclusion was made from a variety of observations, that the generation of vapor is a major factor in the enhancement of collected current.

N80-14925/5 PC **A05**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Plasmaforschung.
Soft X-Ray Measurements for Investigating Plasma Focus Dynamics.
B. Nahrath. 1978, 80p IPF-78-1
Text in German; English Summary.

In a Mather-type plasma focus, short time soft X-ray pictures were taken to study the local development of electron temperature with a time resolution of 3 nanoseconds. The measured electron temperatures were roughly in accordance with the results of magnetohydrodynamic calculations up to maximum compression. During a later phase, characterized by the occurrence of m=0 instabilities, localized plasma regions with high densities and high electron temperatures of about 600 eV were observed. A slowly decaying plasma with local electron temperature values of about 300 eV and large diffuse structures was identified for several hundred nanoseconds. During this 'late phase' of the focus most of the neutron emission takes place. There is no correlation between the value of electron temperature and the rate of neutron emission.

N80-14926/3 PC **A05**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Plasmaforschung.
Measurement of the Ion Profile by Stationary CO2 Laser Scattering from a Hydrogen Plasma.
H. Hailer. 1978, 93p IPF-78-5
Text in German; English Summary.

Collective laser light scattering with a cw CO2 laser is applied to a magnetically stabilized hydrogen arc. In the experimental geometry (theta = 90 deg, lambda = 10.6 microns) the scattering pa-

rameter is alpha = 7. With a laser power of 160 W and a Ge:Hg detector NEP of 60 pico W/(sq. root of Hz), sufficient signal to noise ratios are achieved using lock in techniques. Spectral resolution is performed by pressure scanning with a Fabry-Perot spectrometer with Ge plates. The measured ion profiles agree with theory for a thermal plasma. Values for the ion temperatures are obtained.

N80-14927/1 PC **A03**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Plasmaforschung.
Non-Axial-Symmetric Alfven Waves in Cylindrical, Radial Inhomogeneous Plasmas.
E. Raeuchle. Aug 78, 44p IPF-78-6
Text in German; English Summary.

The propagation of nonaxisymmetric Alfven waves is investigated theoretically. Eigenfunctions and dispersion relations are calculated numerically for radial inhomogeneous cylindrical plasmas. Resistivity, neutral particle loading, and ion cyclotron effects are included in the magnetohydrodynamic treatment. The investigations are of importance for plasma heating by Alfven waves.

N80-14928/9 PC **A04**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Plasmaforschung.
Light Scattering from an Arc Plasma with Stationary CO2 Laser and Heterodyne Detection.
J. H. Massing. 1978, 67p IPF-78-8
Text in German; English Summary.

Collective high scattering experiments with IR lasers on fusion oriented plasmas using optical heterodyne detection are discussed. Heterodyne detection is combined with a modulation technique to improve the receiver sensitivity in the experiment. The scattering arrangement was applied to a hydrogen arc plasma. With a power of less than 20 W for the stationary CO2 laser, thermal density fluctuations were recorded with a 20 sec duration of measurement. The spectra obtained with a scattering angle of 38 mrad is discussed in relation to theory.

N80-14929/7 PC **A02**/MF **A01**
Akademiya Nauk SSSR, Moscow. Inst. of Space Research.
Anomalous Electron Thermal Conductivity Across Destroyed Magnetic Surfaces.
A. A. Galeev, and L. M. Zeleny. 1979, 20p PR-501

A plasma slab model is discussed, in which the magnetic surfaces are parallel to the plane YZ, presenting sheared magnetic field lines in the presence of magnetic fluctuations perpendicular to the undisturbed magnetic surfaces. The magnetic fluctuations are assumed to be quasistatic, for which a restriction is imposed on the frequency of the fluctuations. The velocity of the cross-field transport of electrons due to these fluctuations is determined, showing that the calculated coefficient corresponds to the cross-field anomalous electron thermal conductivity. A new semicollisional regime of anomalous thermal conductivity is described, being an intermediate state between the collisionless and hydrodynamic regimes.

20K. Solid Mechanics

AD-A078 365/4 PC **A02**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
A Numerical Approach to Elastic-Plastic Plane-Strain Problems of Thick-Walled Cylinders.
Technical rept.,
P. C. T. Chen. Oct 79, 22p Rept no. ARLCB-TR-79026
Presented at the Southeastern Conference on Theoretical and Applied Mechanics (10th), Tennessee Univ., Knoxville, 17-18 Apr 80.

A new finite-difference approach has been developed for solving the elastic-plastic plane-strain problems of thick-walled cylinders subjected to internal or external pressure. The material is assumed to obey the von Mises' yield criterion, the Prandtl-Reuss flow theory and the isotropic hardening rule. The numerical scheme is stable for ideally-plastic as well as straining-hardening materials. The approach is simpler than others, and very accurate solutions can be obtained by reducing the grid sizes and load increments. The results for the stresses and strains in all principal directions have been computed as functions of loading history. (Author)

AD-A078 374/6 Not available NTIS
Naval Research Lab Washington DC Shock and Vibration Information Center
The Shock and Vibration Digest. Volume 11, Number 10,
Judith Nagle-Eshleman. Oct 79, 90p
See also Volume 11, Number 9, AD-A074 320.
Availability: Naval Research Lab., Attn: Code 8404. Washington, DC 20375. Annual Rate $100.00 (No copies furnished by DTIC).

Contents: Dynamic Mechanical Properties of Fiber-Reinforced Composite Materials; Recent Research in Composite and Sandwich Plate Dynamics; Optimization Techniques for Shock and Vibration Isolator Development; and Abstracts from the Current Literature.

AD-A078 375/3 Not available NTIS
Naval Research Lab Washington DC Shock and Vibration Information Center
The Shock and Vibration Digest. Volume 11, Number 11,
Judith Nagle-Eshleman. Nov 79, 96p
See also Volume 11, Number 10, AD-A078 374.
Availability: Naval Research Lab., Attn: Code 8404. Washington, DC 20375. Annual Rate $100.00 (No copies furnished by DTIC).

Contents: A Review of Substructure Analysis of Vibrating Systems; Flow-Induced Vibration of Nuclear Reactor Fuel. Part I: Modeling; Computer Programs: Shock and Vibration Isolation; and Abstracts from the Current Literature.

AD-A078 397/7 PC **A02**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Purposes and Problems of Structural Fatigue.
Structures technical memo.,
D. G. Ford. Aug 79, 15p Rept no. ARL/STRUC-TM-298

This is a qualitative description of the abstraction which has led to the problems of applied probability theory treated in structural fatigue. It also describes the relation of this to the life philosophies of safelife, fail-safe and damage tolerant design. The experimental data needed to apply structural fatigue is also discussed. (Author)

AD-A078 634/3 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
A Special Crack Tip Element for Three-Dimensional Crack Problems.
Structures rept.,
Rhys Jones, and Richard J. Callinan. Nov 78, 26p Rept no. ARL/STRUC NOTE-374

This paper develops a finite element method for determining the stress intensity factors along the edge of a crack in an arbitrary three-dimensional body. A special element is placed around the crack front and in each special element the stresses and displacements are derived using the asymptotic nature of the stress and displacement fields near a crack tip. The method is based on the authors' previous technique for evaluating the stress intensity factors in cracked sheets, and coincides with this method in the case of a through crack in a thin sheet. As illustrative examples the problems of a semicircular surface flaw and an internal penny shaped crack are considered. In each case the computed values of the stress intensity factors are in excellent agreement with known analytical results, (Author)

AD-A078 785/3 PC **A04**/MF **A01**
Pennsylvania State Univ University Park Applied Research Lab
Vibration of a Clamped Circular Plate Driven by a Noncentral Force.
Technical memo.,
J. C. Snowdon. 31 Oct 79, 57p Rept no. ARL/PSU/TM-79-191
Contract N00024-79-C-6043

Expressions are stated for the transmissibility and for the driving-point impedance of an internally damped circular plate of radius a with a clamped boundary that is driven by a vibratory point force at an arbitrary distance micron from the plate center. Expressions are also stated for the plate transmissibility when the plate is loaded at the arbitrary driving point either by a lumped mass, by a dynamic vibration absorber--or, simultaneously, by a lumped mass and a dynamic absorber. In all cases, representative calculations of transmissibility are plotted versus the square root of frequency. These curves clearly show the dependence of transmissibility and impedance on the plate damping factor, the value of the parameter mu, and the extent of the mass loading. They also show the effectiveness of the dynamic absorber, which varies with the value assigned to mu. (Author)

AD-A078 920/6 PC **A02**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Dynamic Stability of Columns Subjected to Nonconservative Forces.
Technical rept.,
J. J. Wu, and J. D. Vasilakis. Oct 79, 23p
ARLCB-TR-79030, AD-E440 053

The numerical results of a class of problems of linear elastic stability problems subjected to nonconservative forces and under various support conditions are presented. A single solution formulation by which these results have been obtained is described. Accuracy of these results compared with those reported in the literature is discussed.

N80-14401/7 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Optimal Rotating Column.
S. Adali. Mar 79, 33p CSIR-TWISK-76

The optimization of a column clamped to the rim of a wheel rotating at constant angular velocity is discussed. An optimal shape for a column of specified volume and minimum thickness and radius-to-length ratio is determined to maximize the critical rotational speed. In addition, the height-to-width ratio and thickness distribution of a uniform or optimal rectangular column are optimized so that the column buckles not only in the direction of one of the two principal axes, but assumes a buckled shape having displacement components along both axes.

N80-14414/0 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Unified Formalism of Strain and Stress.
R. Roesel. Mar 79, 16p CSIR-TWISK-77

The classical analysis of stress and strain pertaining to 'infinitesimal' deformations of arbitrary continuous bodies is reviewed. The concept of an exact sequence of sets and operators is introduced and the sequence diagram is presented as a mnemonic device embodying several theorems in one concept.

20L. Solid-State Physics

AD-A078 320/9 PC **A02**/MF **A01**
Illinois Univ At Urbana-Champaign Dept of Electrical Engineering
InGaAsP Quaternary Materials for Near Infrared Detector and Laser Applications.
Quarterly technical rept. no. 8, 1 Apr-30 Jun 79,
N. Holonyak, Jr., and G. E. Stillman. 1 Jul 79, 8p
Contract N00014-77-C-0086, ARPA Order-3316

The study of the influence of different parameters on the growth of InP using the hydride growth technique has been continued. This work is to be presented at the 156th Electrochemical Society Meeting, Los Angeles, 1979, and an abstract is included with the reprints/preprints at the end of this report. Because of moisture damage and contamination sustained during a flood this summer, it was decided to implement the new automatic gas flow control system described in the last report as soon as possible. The old system has been disassembled and heliarc welding on the new system is progressing rapidly. Included at the end of this report are some reprints of papers that have been received since the last report and some preprints and abstracts of more recent work.

AD-A078 362/1 PC **A02**/MF **A01**
Fairchild Camera and Instrument Corp Palo Alto CA Research and Development Lab
Process Variable Dependence and Interrelationship between Avalanche Injected and Radiation Induced Carrier Trapping in Thermal Oxides.
Progress rept. no. 2, 1 Jul-30 Sep 79.
Oct 79, 15p
Contract N00014-79-C-0297

Progress to data includes the completion of the automated avalanche carrier injection and trapping system, the preparation of samples to study hole and electron trapping in dry as well as wet oxides, and the measurements of the effects of various process parameters on the trapping characteristics of thermal silicon dioxide.

AD-A078 398/5 PC **A02**/MF **A01**
Electronics Research Lab Adelaide (Australia)
Thin Film Annealing by Ion Bombardment.
Technical rept.,
E. H. Hirsch, and I. K. Varga. Aug 79, 19p Rept no. ERL-0092-TR

The enhancement of film adherence resulting from argon ion bombardment during the evaporation procedure has been studied experimentally. The observations point to the existence of an annealing effect caused by atomic rearrangement in bombardment induced temperature spikes. This mechanism begins to be effective at a critical minimum bombardment the deposited material is subjected to rearrangement soon after it has condensed. The small amount of argon incorporated into the film by the bombardment is shown to have on significant influence on the process. (Author)

AD-A078 430/6 PC **A03**/MF **A01**
Salford Univ (England) Dept of Pure and Applied Physics
Scanning Transmission Electron Microscopy of Electromagnetic Structure.
Final rept. 1 Oct 78-30 Sep 79,
Robert S. Tebble. 21 Oct 79, 39p AFOSR-TR-79-1265
Grant AFOSR-76-2896

The report describes the application of Lorentz electron microscopy to the study of structural changes of amorphous alloys in composition region approximately Fe80B20. Significant changes in the magnetic domain structure can in certain instances be associated with phase transitions, segregation and stress effects together with changes in the amorphicity. The appearance of magnetization ripple snd the formation of regular stripe domain patterns are examples of the magnetic structures which can be observed by defocussing the electron microscope in the transmission mode. Parallel observations have been made using established X-ray and electron diffraction crystallographic techniques, Mossbauer effect and differential scanning calorimetry. (Author)

AD-A078 441/3 PC **A11**/MF **A01**
Harvard Univ Cambridge MA Div of Applied Sciences
Nonequilibrium Phenomena in Superconducting Phase-Slip Centers.
Interim rept.,
Alan M. Kadin. Oct 79, 226p Rept no. TR-15
Contracts N00014-77-C-0085, N00014-75-C-0648
Sponsored in part by Grant NSF-DMR79-04155.

This report presents the results of a study on the current-induced breakdown of superconductivity in a quasi-one-dimensional filament. This report has investigated the effects of a magnetic field H on nonequilibrium quasiparticle relaxation processes in superconductors by analyzing the I-V characteristics of long tin microbridges in a parallel field near T sub c(H). In the theoretical studies, using a generalized two-fluids picture to describe a quasi-one-dimensional superconductor near T sub c (for H equal 0), a heuristic derivation for a set of equations governing the temporal and spatial evolution of the charge imbalance (or branch imbalance) in the quasiparticles is provided. A novel consequence of the model is a prediction of intrinsic hysteresis in the dc current-voltage relation. The model also provides a convenient framework for dealing with ac effects in PSC's, including resonance and synchronization in systems of closely-spaced PSC's and microbridges.

AD-A078 445/4 PC **A02**/MF **A01**
California Univ Irvine Dept of Physics
Influence of a Magnetic Field on High-Frequency Relaxation Time in N-type Polar Semiconductors,
S. Katayama, and D. L. Mills. 26 Dec 78, 13p AFOSR-TR-79-1105
Contract F49620-78-C-0019
Pub. in Physical Review B, v19 n12 p6513-6524, 15 Jun 79.

No abstract available.

AD-A078 446/2 PC **A02**/MF **A01**
California Univ Irvine Dept of Physics
Theory of Light Scattering from Soft Modes in IV-VI Compounds,
S. Katayama, and D. L. Mills. 22 Sep 78, 19p AFOSR-TR-79-1106
Contract F49620-78-C-0019
Pub. in Physical Review B, v19 n12 p6372-6389, 15 Jun 79.

No abstract available.

AD-A078 448/8 PC **A02**/MF **A01**
California Univ Irvine Dept of Physics
Influence of FD Mixing on Electronic Impurity Levels in Rare Earth Semiconducting Compounds,
R. Camley, J. C. Parlebas, K. R. Subbaswamy, and D. L. Mills. 1979, 3p 78-56, AFOSR-TR-79-1104
Contract F49620-78-C-0019
Pub. in Jnl. de Physique, supp15 v40 p372-373 May 79. Abstract in French.

No abstract available.

AD-A078 452/0 PC **A02**/MF **A01**
California Univ Davis
Band Structures and Optical Properties of CdSnP2 and CdSnAs2,
J. F. Alward, C. Y. Fong, and F. Wooten. 22 Jan 79, 5p AFOSR-TR-79-1126
Grant AFOSR-77-3390
Pub. in Physical Review B, v19 n12 p6337-6340, 15 Jun 79.

No abstract available.

AD-A078 458/7 PC **A02**/MF **A01**
California Univ Irvine Dept of Physics
Light Scattering Spectra of Guided Wave Polaritons in Thin Crystals: Experiment,
J. B. Valdez, G. Mattei, and S. Ushioda. 8 May 78, 5p UCI-TR-77-74, AFOSR-TR-79-1135
Grant AFOSR-77-3222
Pub. in Solid State Communications, v27 n11 p1089-1092 1978.

No abstract available.

AD-A078 666/1 PC **A02**/MF **A01**
Princeton Univ NJ Joseph Henry Labs of Physics
Why Do Glassy Materials Possess Energy Gaps.
Technical rept.,
D. C. Licciardello. 13 Dec 79, 13p
Contract N00014-77-C-0711, Grant NSF-DMR78-03015
Prepared in cooperation with Bell Telephone Labs., Inc., Murray Hill, NY.

We discuss the nature of transparency in glassy matherials. The accepted view provides for energy gaps due to the persistence (into the glassy state) of structure in the electronic spectrum. An alternative mechanism, discussed here, follows from inclusion of a strong electron phonon interaction for localized electronic state. We examine the consequences of varying the strength of the interaction for a simple model, and predict a qualitatively different behavior for strong and weak coupling. (Author)

AD-A078 676/4 PC **A05**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Solid State Research.
Quarterly technical summary rept. 1 Feb-30 Apr 79,
Alan L. McWhorter. 15 May 79, 88p TR-1979-2, ESD-TR-79-150
Contract F19628-78-C-0002

This report covers in detail the solid state research work of the Solid State Division at Lincoln Laboratory for the period 1 February through 30 April 1979. The topics covered are Solid State Device Research, Quantum Electronics, Materials Research, Microelectronics, and Analog Device Technology. Funding is primarily provided by the Air Force, with additional support provided by the Army, ARPA, NSF, and DOE. (Author)

AD-A078 687/1 PC **A02**/MF **A01**
Technion - Israel Inst of Tech Haifa Solid State Inst
Transport and Recombination Properties of Lead Tin Telluride Alloys.
Final rept. 1 Jan 78-30 Sep 79,
Kurt Weiser. 1979, 13p AFOSR-TR-79-1260
Grant AFOSR-78-3509

Doping effects and photoconductivity were studied for single crystal films of lead tin telluride (Pb(0.8)Sn(0.2)Te) grown by vapor phase epitaxy. Growth of films was carried out by an evaporation condensation process in which the alloy was evaporated from a polycrystalline source and the vapor was condensed on a barium fluoride substrate. Interesting doping effects were obtained with indium which produces a deep level in the gap with unusual properties. Extensive galvanomagnetic measurements suggest that indium enters as a self-compensating impurity and pins the Fermi level near midgap, in contrast to other Group III elements such as gallium and thallium which dope the material n-type and p-type, respectively. An investigation of the kinetics of photoconductivity revealed that around the 'device temperature' of 77 K, the recombination of excess carriers is thermally activated, but becomes approximately temperature independent below 50 K. These results and the magnitude of the photoconductive life-time lead to the surprising conclusion that contrary to prevailing opinion, Auger recombination is not the dominant recombination mechanism for samples with carrier concentration in the 1-10/10 to the 16th power cc range. (Author)

AD-A078 719/2 PC **A05**/MF **A01**
North Carolina State Univ Raleigh Solid State Electronics Lab
A Theoretical Search for Super-Velocity Semiconductors.
Annual rept. 1 Jan-31 Dec 79,
M. A. Littlejohn, J. R. Hauser, and T. H. Glisson. Dec 79, 80p
Contract N00014-76-C-0480

This report presents the results of research on carrier transport in III-V semiconducting compounds and alloys and the performance of microwave devices fabricated from those compounds and alloys. (Author)

AD-A078 801/8 PC **A03**/MF **A01**
Warwick Univ Coventry (England) Dept of Physics
Compton Scattering Studies of Metals and Hydrides with 412 keV Gamma Radiation.
Final technical rept. Oct 77-Sep 79,
Malcolm J. Cooper. Sep 79, 35p
Grant DA-ERO-77-G-099

A 412 KeV Compton spectrometer has been designed at Warwick, and commissioned at the SRC Rutherford Laboratory. The performance of the system was highly satisfactory, but routine operation of the equipment has been hampered by deterioration in the resolution of the detector, and delays have occurred as a result of faults in the computerised data acquisition system. The Compton profile of vanadium has been measured, and is found to be in disagreement with theory, the anisotropies being smaller than predicted. In related investigations evidence for the failure of the impulse approximation has been found, and the viability of obtaining cohesive energies from Compton profiles has been assessed. (Author)

AD-A078 816/6 MF **A01**
Varian Associates Inc Palo Alto Ca
Research on InGaAs FET's.
Interim technical rept.,
S. Bandy, T. Boyle, R. Fulks, S. Hyder, and C. Nishimoto. Sep 79, 64p Rept no. TR-1

Contract N00014-78-C-0380
Availability: Microfiche copies only.

Virtually the whole effort for this period was spent in trying to grow by Vapor Phase Epitaxy (VPE) dislocation-free InGaAs on GaAs at in percentages above 25%. Of all the techniques tried, significant improvement came only after installation of a H2 bypass on the reactor. Field Effect Transistors (FETs) fabricated on the best of the pre-H2 bypass wafers showed sub-GaAs values for the effective saturated velocity, and FETs have yet to be fabricated on the wafers grown with the H2 bypass. Efforts at ion-implanting the pre-H2 bypass wafers were not successful, presumably because of the heavy amount of dislocations in the material. (Author)

AD-A078 830/7 PC **A04/MF A01**
Dayton Univ OH Research Inst
Applied Surface Analysis Workshop.
Final rept.,
John T. Grant. Oct 79, 68p UDR-TR-79-67, AFML-TR-79-4153
Contract F33615-79-C-5130

This report describes the Applied Surface Analysis Workshop held at the University of Dayton, Dayton, Ohio on 13-15 June 1979. Thirty-eight papers were presented at the Workshop, five of them being from invited speakers. Approximately 100 scientists active in the field of surface analysis participated in the Workshop. (Author)

PAT-APPL-6-074 263 PC **A02/MF A01**
Department of the Air Force Washington DC
Method for Controlling the Resonance Frequency of Yttrium Iron Garnet Films.
Patent Application,
Howard L. Glass. Filed 11 Sep 79, 12p AD-D006 767/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method for controlling the resonance frequency of single crystal yttrium iron garnet (YIG) films by incorporating lead as a partial substituent for the yttrium component of the YIG film. This invention relates to yttrium iron garnet films and to a method for their preparation. More particularly, this invention concerns itself with a method for controlling the resonance frequency of single crystal yttrium iron garnet (YIG) films grown by liquid phase epitaxy (LPE). Single crystal yttrium iron garnet, having the formula Y3Fe5O12 and being hereinafter referred to as YIG, is an important crystalline material finding wide application for use in a variety of electronic devices. The material can be utilized in either its single crystal bulk form or as a single crystal film grown on a suitable substrate. In bulk form, the material is often used as an optical modulator, a magnetic flux sensor and in magneto-optical memory devices because of its faraday effect. The major interest in the film form is for applicatons in magnetic bubble domain devices and in microwave signal processing devices

PB80-120058 PC **A03/MF A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Semiconductor Measurement Technology: An Automated Photovoltaic System for the Measurement of Resistivity Variations in High-Resistivity Circular Silicon Slices.
Final rept. Dec 75-Oct 77,
David L. Blackburn. Nov 79, 35p NBS-SP-400-52
Sponsored in part by Department of Energy, Washington, DC. Library of Congress catalog card no. 79-600178.

This report describes an automated photovoltaic system for nondestructive measurement of resistivity variations of high-resistivity circular silicon slices. The computer-based system for making the measurements is described, detailed construction diagrams are given to facilitate reproduction of the system, and a listing of the computer program for controlling the system is given. Comparisons between resistivity profiles determined using the automated photovoltaic system and the four-probe technique indicate that the photovoltaic system is adequate for production screening and incoming inspection of high-resistivity float-zoned silicon slices.

PB80-803885 PC **N01/MF N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Ion Implantation (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Nov 79,
Gerald F. Zollars. Jan 80, 55p
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography of citations to the international literature concerns the ion implantation method for introducing impurities into the surface layer of a solid, particularly as applied to semiconductor devices such as field-effect transistors and solar cells. Specific topics include equipment, techniques, semiconductor doping, and radiation effects on material properties. (Contains 233 citations)

20M. Thermodynamics

N80-14212/8 PC **A12/MF A01**
Engineering Information Systems, Inc., San Jose, CA.
SPAR Thermal Analysis Processors Reference Manual, System Level 16. Volume 1: Program Execution.
M. B. Marlowe, R. A. Moore, and W. D. Whetstone. Oct 79, 262p NASA-CR-159162, EISI-TR-4007-2-V-1
Contract NAS1-14464

User instructions are given for performing linear and nonlinear steady state and transient thermal analyses with SPAR thermal analysis processors TGEO, SSTA, and TRTA. It is assumed that the user is familiar with basic SPAR operations and basic heat transfer theory.

20N. Wave Propagation

AD-A078 477/7 PC **A07/MF A01**
Syracuse Univ NY Dept of Electrical and Computer Engineering
Electromagnetic Transmission through a Filled Slit of Arbitrary Cross Section in a Conducting Plane of Finite Thickness.
Phase rept.,
David T. Auckland, and Roger F. Harrington. Oct 79, 145p RADC-TR-79-257
Contract F30602-79-C-0011

Electromagnetic transmission through a filled slip in a conducting plane of finite thickness is investigated when the slip cross section is an arbitrary shape. A non-modal formulation is developed whereby the original problem is broken up, via the equivalence principle, into three isolated situations. An integral equation is written for each of these situations involving equivalent electric and magnetic currents as unknowns on the closed contour defining the slit cross section. These three integral equations are solved simultaneously and it is shown that they have a unique solution at all frequencies. A modal solution is also developed for the case when the slit cross section can be viewed as a sequence of two-dimensional rectangular cavities, each coupled to the other by an aperture. Results obtained from these two solutions are compared. Some additional slits, which cannot be solved by a modal solution, are investigated by the non-modal solution. Two approximate solutions are also investigated when the slit cross section is rectangular. For small slit widths W, such that KOW much less than 1, the transmitted fields can be written in terms of a slit impedance for TE case, and a slit polarizability for the TM case. An equivalent circuit is developed for the TE case and comparison with the modal solution is made for the slit impedance and transmission coefficient. The equivalent circuit involving the aperture impedance of a flange is shown to accurately determine the transmission characteristics of the slit.

AD-A078 682/2 PC **A07/MF A01**
TRW Defense and Space Systems Group Redondo Beach CA
Finite Element Application to Transient Scattering Problems.
Final technical rept. Jan 78-Oct 79,
A. Sankar, and T. C. Tong. 31 Oct 79, 131p TRW-79-002-AFOSR, AFOSR-TR-79-1302
Contract F49620-78-C-0049

Finite element method is applied to compute the induced current distributions on arbitrarily-oriented thin wire in the time domain due to arbitrary pulses. The required mathematical equations and computer code are developed. The predictions by this method compare very well with other techniques. Advantages of this approach are mentioned. (Author)

AD-A078 852/1 PC **A05/MF A01**
New Mexico Univ Albuquerque Dept of Electrical Engineering and Computer Science
Calculation of the Singularity Expansion Method Parameters from the Transient Response of a Thin Wire.
Final rept.,
Kah-Song Cho, and J. T. Cordaro. Sep 79, 80p EE-264(79)AFOSR-723-1, AFOSR-TR-79-1306
Grant AFOSR-78-3723

The problem of determining the singularity expansion method (SEM) parameters from transient thin-wire data is examined. A computer code is used to generate response data. The SEM parameters are computed from these data. For noisy data, it is shown that the parameter values can be improved by signal averaging. (Author)

AD-A078 891/9 PC **A02/MF A01**
Rochester Univ NY Dept of Physics and Astronomy
Coherence Theory with Special Reference to Energy Transfer.
Final rept. 10 Oct 76-9 Oct 79,
Emil Wolf. Nov 79, 18p ARO-14074.18-P
Contract DAAG29-77-G-0006

Most of the research was concerned with improvements of the usual phenomenological theory of radiative energy transfer and with the elucidation of the connection between that theory and the new rigorous stochastic theory of fluctuating wave fields.

N80-14290/4 PC **A05/MF A01**
Ohio State Univ., Columbus. Dept. of Electrical Engineering.
High Frequency Scattering from a Thin Lossless Dielectric Slab.
M.S. Thesis.
K. W. Burgener. Nov 79, 77p NASA-CR-162564, OSU-TR-710964-4
Grant NSG-1498

A solution for scattering from a thin dielectric slab is developed based on geometrical optics and the geometrical theory of diffraction with the intention of developing a model for a windshield of a small private aircraft for incorporation in an aircraft antenna code. Results of the theory are compared with experimental measurements and moment method calculations showing good agreement. Application of the solution is also addressed.

N80-14789/5 PC **A05/MF A01**
European Space Agency, Paris (France).
Ray Tracing and Application of the Geometrical Theory of Diffraction for Calculating the Scattered Fields of Complicated Structures.
A. Schrott. May 79, 81p ESA-TT-595, DFVLR-FB-78-19
Tran-Transl. Into English of 'Konstruktion der Strahlenwege und Anwendung der Geometrischen Beugungstheorie Zur Berechnung von Streufeldern Komplizierter Koerper', Dfvlr, Oberpfaffenhofen, (Germany F.R.) Report Dfvlr-FB-78-19, 16 Oct. 1978. Misc-Original German Report Available from Dfvlr, Cologne Dm 26,90.

For important basic structures of satellites and aircraft, such as polyhedral convex bodies and circular or elliptical cylinders, the ray tracing is treated in detail. Ray tracing for composite structures is described for the example of an aircraft which is approximated by an elliptical cylinder with flat plates as wings. The programs used for the computation of antennas on complicated structures are discussed. The field of application and the accuracy of the geometrical theory of diffraction is demonstrated with numerous computed examples.

PAT-APPL-6-092 143 PC **A02/MF A01**
National Aeronautics and Space Administration. Pasadena Office, CA.

Method for Shaping and Aiming Narrow BEAMS.
Patent Application,
R. C. Heyser. Filed 7 Nov 79, 19p N80-12256/7, NASA-CASE-NPO-14632-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method and apparatus is disclosed for use of a linear frequency chirp in a transmitter/receiver having a correlator to synthesize a narrow beamwidth pattern from otherwise broad beam transducers when there is relative velocity between the transmitter/receiver and the target. The chirp is so produced in a generator in bandwidth, B, and time, T, as to produce a time-bandwidth product, TB, that is increased for a narrower angle. A replica of the chirp produced in a generator is time delayed and Doppler shifted for use as a reference in receiver for correlation of received chirps from targets. This reference is Doppler shifted to select targets preferentially, thereby to not only synthesize a narrow beam but also aim the beam in azimuth and elevation.

21. PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A078 465/2 PC **A05/MF A01**
Sri International Menlo Park CA
Contribution of Surface Catalysis and Gas Phase Reaction to Catalytic Combustor Performance.
Final rept. 15 Aug 77-15 Aug 79,
C. M. Ablow, S. Schechter, H. Wise, and B. J. Wood. Oct 79, 81p AFOSR-TR-79-1146
Contract F49620-77-C-0123

Engineering studies with catalytic combustors in the main burner and afterburner of aircraft propulsion systems have been concerned with the attainment of high combustion efficiency and flame stabilization of fuel-air mixtures outside the conventional flammability limits. The development of such devices that will perform at optimum efficiency over a broad range of operating conditions requires a detailed understanding of the flow of a reactive gas through ducts with catalytic walls, in which both hetorogeneous (wall) and homogeneous (gas) chemical reaction kinetics can occur. Of special interest to our study is the evaluation of the relative contributions of surface-catalyzed and gas-phase reactions to the total heat release rate in a catalytic combustor over a range of operating variables that include gas flow velocity, catalyst temperature, surface reactivity , and fuel-air ratio. Two catalytic combustor systems were employed. One involved stagnation point boundary layer flow with a catalytically active flat surface, the other duct flow in a multichannel catalytic monolith. The experimental studies were supplemented by theoretical calculations of heat release rates and temperature profiles based on models appropriate to the geometry and fluid dynamics of each catalytic combustion system. The result of our studies with dilute propane-air gas mixture and platinum coated surfaces have demonstrated that in both combustor configurations the gas phase combustion can be initiated by the wall-catalyzed reaction.

AD-A078 467/8 PC **A03/MF A01**
Sheffield Univ (England) Dept of Chemical Engineering and Fuel Technology
Coherent Structures in Turbulent Flames.
Interim rept. 1 Aug 78-1 Aug 79,
A. J. Yule, and N. A. Chigier. 1979, 37p AFOSR-TR-79-1141
Grants AFOSR-77-3414, DA-ERO-79-0031
Sponsored in part by Grant NASA-NSG-7517.

Diagnostic and data analysis techniques have been used to investigate the structure of turbulent jet reacting flows with well defined initial and boundary conditions. In the transition region of a turbulent jet flame a double-vortex structure has been found: with outer vortices, which may originate from Kelvin-Helmholtz or Rayleigh type instabilities, and inner vortices which are influenced strongly by one or more combustion instability mechanisms. Measurements of mean velocity, turbulence intensity, ionization current, mean temperature and peak frequencies are presented together with data derived from high speed color schlieren photography and laser schlieren spectra.

AD-A078 612/9 PC **A04/MF A01**
National Aeronautics and Space Administration Langley Station VA Langley Research Center
Effect of Pressure on Structure and NOX Formation in CO-Air Diffusion Flames.
Technical paper,
Howard G. Maahs, and Irvin M. Miller. Oct 79, 58p NASA-L-12731, NASA-TP-1448

A study has been made of flame structure and nitric oxide formation in confined laminar CO-air diffusion flames over a pressure range from 1 to 50 atm. The shape of the flames changed from wide and convex at 1 atm to slender and concave at 50 atm, with the greatest change occurring below about 10 atm. Flame height decreased with increasing pressure from 1 atm to about 10 atm, but was independent of pressure at higher pressures. The regimes of stable burning decreased with increasing pressure up to 50 atm, with the greatest reduction occurring between 1 atm and 20 atm. The molar emission index (the moles of nitrogen oxides formed per mole of carbon monoxide consumed) increased as the pressure was increased above 1 atm, reached a maximum at approximately 28 to 30 atm, and thereafter decreased slowly up to 50 atm. Circumstantial evidence is offered to support the proposition that the concentrations of nitrogen oxides in the flames approach their equilibrium values for pressures above about 20 atm. (Author)

AD-A078 625/1 PC **A06/MF A01**
Purdue Univ Lafayette IN Project Squid Headquarters
The Structure of Eddies in Turbulent Flames - I.
Technical rept.,
Norman A. Chigier, and Andrew J. Yule. Mar 79, 104p Rept no. SQUID-US-1-PU
Contract N00014-75-C-1143
Prepared in cooperation with Sheffield Univ. (England). Dept. of Chemical Engineering and Fuel Technology.

High frequency response measurement techniques are used with data processing and conditional sampling to measure large eddy structure and coherence in the transitional flow region of turbulent diffusion flames. Comparisons are made between nonburning and burning flow conditions; these show physical similarity for cold and burning flows in the transitional region. Flow visualization shows quasi-laminar interface layers which are distorted, stretched and convoluted by vortex interactions. High-speed Schlieren color movies show axisymmetric wave and vortex ring formation. Velocity, temperature and ionization density measurements show that the transitional flow and the potential core of the jet are much longer in the flame than in the nonburning jet. A marked difference is found between the initial fundamental instability frequencies of the shear layers; the most amplified frequency predicted by stability theory for cold inviscid flow is found in the cold jet but not the flame. Increase in viscosity due to heat release causes delay and damping of the processes of vortex formation and coalescence; dilatation and buoyancy forces also contribute to differences between the flame and cold jet. Large eddies are shown to play an important role in the transitional region of turbulent jet flames.

AD-A078 655/8 PC **A02/MF A01**
Indiana Univ At Bloomington Dept of Chemistry
An Accurate Model for Sample Droplet Acceleration in Analytical Flames.
Interim technical rept.,
Richard E. Russo, and Gary M. Hieftje. 5 Dec 79, 20p Rept no. TR-24
Contract N00014-76-C-0838

The experimentally observed velocity of an aerosol droplet in an air-acetylene flame is compared to the velocity calculated through a new mathematical model. The experimental droplet velocity is measured by means of stroboscopic photography of a stream of individual droplets sent into a flame at a known frequency and traveling very reproducible trajectories. Because the temporal spacing between these droplets is known, a measure of the instantaneous droplet location enables their velocity to be calculated. The droplet acceleration model was modified by incorporating into it a spatially changing flame rise velocity, which was assumed constant in earlier treatments. Excellent agreement has been found between calculated and measured droplet acceleration in the flame. (Author)

AD-A078 728/3 PC **A04/MF A01**
Tennessee Technological Univ Cookeville Dept of Mechanical Engineering
Amplification of Reynolds Number Dependent Processes by Wave Distortion.
Final rept. 1 Jan 72-31 Oct 79,
Marie B. Ventrice. Nov 79, 59p NASA-CR-159732
Contract NGR-43-003-015

The object of the research was to investigate the amplification of a Reynolds number dependent process by wave distortion and the possibility of applying the results to other similar Reynolds number dependent processes. The process investigated was that associated with the operation of a constant-temperature hot-wire anemometer. The application of most interest was investigation of vaporization limited combustion, the type combustion typically associated with liquid propellant rocket engines. A series of experiments were carried out to determine the effect of wave distortion on a Reynolds number dependent process and to establish the analogy between the anemometer process and the combustion process. Both analytical and experimental studies were involved, both having the ultimate objective of identifying parametric trends, recognizing behavior common to different chamber geometries and determining stability boundaries. The results indicate a high degree of similarity between the two processes and the possibility of using the anemometer system to investigate combustion instability. The nonlinear aspects of a Reynolds number dependent process appear to be the dominant mechanisms controlling instability. (Author)

AD-A078 831/5 PC **A03/MF A01**
Princeton Univ NJ Dept of Mechanical and Aerospace Engineering
Solid Propellant Combustion Mechanism Research.
Annual rept. 1 Apr 78-31 Mar 79,
L. H. Caveny, W. A. Sirignano, and S. W. Cheng. Apr 79, 40p Rept no. MAE-1373
Contract N00014-75-C-0705

This research is directed at making direct measurements of the acoustic admittance of flames and interpreting those measurements in terms of flame models. Laser Doppler velocimetry (LDV) instrumentation, pressure detectors, and data analysis techniques were set up and used successfully to measure the acoustic response of a propane/air burner system. Applications of the techniques to solid propellants are described and are the subjects of the continuing research. (Author)

AD-A078 889/3 PC **A03/MF A01**
Princeton Univ NJ Dept of Mechanical and Aerospace Engineering
Ignition and Flame Propagation in Sprays.
Final rept. 1 Jun 76-30 Aug 79,
William A. Sirignano, and Suresh K. Aggarwal. 1 Dec 79, 47p MAE-1459, ARO-14052.2-E
Grants DAAG29-76-G-0266, DAAG29-77-G-0145
Sponsored in part by Grant DAAG29-78-G-0144.

Flame initiation and propagation through an air-fuel vapor-fuel drop system is numerically modeled in a cylindrical one-dimensional combustor. Using an unsteady formulation and allowing unsteady mass, momentum and heat transfer between the two phases, results have been obtained to observe the effects of activation energy, preexponential factor, intitial droplet size, initial temperature, stoichiometric ratio and diffusivity on the flame propagation. It is observed that the process is essentially unsteady. Also, unlike pre-mixed case, heterogeneous combustion gives rise to large variation in fuel-air ratio, which could produce a secondary diffusion flame in the wake of a propagating flame. (Author)

N80-14125/2 PC **A02/MF A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

Effect of Degree of Fuel Vaporization Upon Emissions for a Premixed Partially Vaporized Combustion System.
L. P. Cooper. Jan 80, 25p NASA-TP-1582, E-010

An experimental and analytical study of the combustion of partially vaporized fuel-air mixtures was performed to assess the impact of the degree of fuel vaporization upon emissions for a premixing-prevaporizing flametube combustor. Data collected in this study showed near linear increases in nitric oxide emissions with decreasing vaporization at equivalence ratios of 0.6. For equivalence ratios of 0.72, the degree of vaporization had very little impact on nitric oxide emissions. A simple mechanism which accounts for the combustion of liquid droplets in partially vaporized mixtures was found to agree with the measured results with fair accuracy with respect to both trends and magnitudes.

21C. Electric Propulsion

N80-14195/5 PC **A08**/MF **A01**
Office National d'Etudes et de Recherches Aerospatiales, Chatillon-sous-Bagneux (France). Directeur de l'Energetique.
Performance Tests of Linear Arrays of Needle Points as Part of a Study on Field Effect Cesium Engines Essais de Fonctionnement de Reseaux Lineares a Fils Affutes pour la Conduite d'Etudes de Propulseurs a Emission de Champ au Cesium.
J. Labbe, and J. Guernigou. 30 Dec 76, 158p ONERA-RTS-1/3127-EY, ESA-CR(P)-1240
Contract ESTEC-2117/73-AK
Language in French.

Tests to characterize the operation of cesium ion emitters, based on a field effect phenomenon are described. Twenty devices, consisting of linear arrays of fine pointed rods and different operating modes and geometries were tested. Results show the flux of nonlinear atoms, diffusing past an optical sensor, is approximately 5% and that a relatively high current (0.9 mA/cm) is generated under conditions of good stability. The essential factor for determining whether or not a dense and homogeneous ionic flux is obtainable is the coefficient of diffusion for the liquid cesium on the ends of the points in the arrays.

21D. Fuels

AD-A078 665/7 PC **A04**/MF **A01**
Southwest Research Inst San Antonio TX Army Fuels and Lubricants Research Lab
Diesel Engine Endurance Test with Water-Containing Fire-Resistant Fuel.
Interim rept. Mar-Sep 77,
J. V. Moffitt, E. C. Owens, B. R. Wright, and W. D. Weatherford, Jr. Sep 79, 60p Rept no. AFLRL-94
Contracts DAAG53-76-C-0003, DAAK70-78-C-0001

A production LDT-465-1C multifuel diesel engine was operated according to a double-length Army/CRC Wheeled Vehicle Test Cycle (420 total hours) using a fire-resistant diesel fuel containing 10 vol% water. The effects of this water-in-fuel macroemulsion on engine power output, deposits, wear, and oil degradation were examined. The results indicate that this fire-resistant fuel formulation, under the conditions evaluated, does not result in abnormal deposits nor are there any major effects (adverse or favorable) on engine wear or oil degradation. However, a significant loss in horsepower output as a function of test duration did result. Post-test examinations indicated the presence of fuel-origin deposits in the injection system which were attributed to the sugar-type surfactants used in this investigation. (Author)

AD-A078 666/5 PC **A03**/MF **A01**
Southwest Research Inst San Antonio TX Army Fuels and Lubricants Research Lab
Evaluation of JP-5 Turbine Fuel in the Single Cylinder Cue 1790 Diesel Engine.
Final rept. Jun-Nov 79,
Richard B. Moon. Nov 79, 42p Rept no. AFLRL-119
Contract DAAK70-79-C-0060

The performance test compared fuel consumption and horsepower of the CUE 1970 when operating on JP-5 turbine fuel in place of Diesell fuel while the endurance test compared engine wear and deposits when operating the CUE 1790 on JP-5 instead of diesel fuel. The performance test indicated no change in power and a 3 + or - 1-percent increase in fuel consumption. The endurance test indicated no change to slightly less wear, less deposits, no change in the oil consumption rate, and nothing unusual or excessive in the used oil analyses. Analysis of the JP-5 indicated a cetane number within diesel fuel specifications. Although further tests are necessary to define the effect of random variables on the test results, from this test it can be concluded that the use of JP-5 in the CUE 1790 resulted in no appreciable loss in performance or service life. As a result, JP-5 is considered to be a satisfactory alternative fuel for use in the AVDS 1790-2C diesel engine.

AD-A078 798/6 PC **A09**/MF **A01**
Southwest Research Inst San Antonio TX Army Fuels and Lubricants Research Lab
Combating High-Sulfur Fuel Effects in a Two-Cycle, High-Speed U.S. Army Diesel Engine.
Interim rept.,
Edwin A. Frame. Aug 79, 177p Rept no. AFLRL-109
Contracts DAAK70-78-C-0001, DAAG53-76-C-0003

Six lubricants were evaluated for their effectiveness in controlling the deleterious effects of using high sulfur diesel fuel. Two of the lubricants gave significant improvement in the condition of some engine areas; however, none of the engine oils tested would allow the continuous use of high sulfur fuel with no penalty in engine condition as compared to the use of low sulfur fuel. (Author)

N80-14130/2 PC **A06**/MF **A01**
Avco Lycoming Div., Williamsport, PA.
Exhaust Emission Reduction for Intermittent Combustion Aircraft Engines.
R. N. Moffett. Oct 79, 114p NASA-CR-159757
Contract NAS3-19754

Three concepts for optimizing the performance, increasing the fuel economy, and reducing exhaust emission of the piston aircraft engine were investigated. High energy-multiple spark discharge and spark plug tip penetration, ultrasonic fuel vaporization, and variable valve timing were evaluated individually. Ultrasonic fuel vaporization did not demonstrate sufficient improvement in distribution to offset the performance loss caused by the additional manifold restriction. High energy ignition and revised spark plug tip location provided no change in performance or emissions. Variable valve timing provided some performance benefit; however, even greater performance improvement was obtained through induction system tuning which could be accomplished with far less complexity.

PAT-APPL-6-080 733 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Flocculation of Coals with Water-Soluble Starch Xanthates.
Patent Application,
George G. Maher. Filed 1 Oct 79, 10p PB80-130586
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Powdered coals are rapidly flocculated from aqueous suspensions by the simple addition of water-soluble starch xanthate, thereby producing a readily recoverable sediment phase and a substantially clear aqueous phase.

PATENT-4 176 040 Not available NTIS
Department of the Navy Washington DC
Coal Liquefaction.
Patent,
Robert N. Hazlett. Filed 8 May 78, patented 27 Nov 79, 4p AD-D006 774/4, PAT-APPL-903 464
Supersedes PAT-APPL-903 464-78, AD-D005 068.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a method for converting coal to liquid hydrocarbons or oil-soluble solids comprises the steps of contacting said coal with oxygen for at least 15 minutes, at a temperature from about 90 to about 225 C., heating the oxidized coal to a temperature from about 250 to about 450 C., and maintaining the temperature for at least 15 minutes. (Author)

PB80-134729 PC **A24**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Symposium Proceedings: Environmental Aspects of Fuel Conversion Technology, IV (April 1979, Hollywood, FL).
Final rept. Sep 78-Sep 79,
Franklin A. Ayer, and N. Stuart Jones. Sep 79, 572p EPA-600/7-79-217
Contract EPA-68-02-3132
See also report dated Apr 78, PB-282 429.

The proceedings document presentations made at the symposium on Environmental Aspects of Fuel Conversion Technology. The symposium acted as a colloquium for discussion of environmentally related information on coal gasification and liquefaction. The program included sessions on program approach, environmental assessment, and control technology development. Process developers, process users, research scientists, and state and federal government officials participated in this symposium, the fourth to be conducted by IERL-RTP on the subject since 1974.

PB80-804214 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Wood as a Fuel (Citations from the NTIS Data Base).
Rept. for 1964-Jan 80,
Audrey S. Hundemann. Feb 80, 54p
Excludes synthetic fuels derived from wood.

Government funded studies dealing with availability, combustion characteristics, economics, and feasibility of using wood and wood wastes as fuel are discussed. Most abstracts pertain to wood- or bark-fired systems used to produce steam and electricity. Studies dealing with the use of wood to produce synthetic fuels are excluded. (Contains 47 abstracts)

PB80-928600 Subscription
Central Intelligence Agency, Washington, DC.
International Energy Statistical Review.
1980, 12 issues
Paper copy available on Subscription, North American Continent price $36.00/year; all others write for quote. Also available in single copies.

The International Energy Statistical Review provides current information and comparisons with recent years for a variety of topics on international energy; almost all concern some aspect of the petroleum and natural gas industries. Six charts deal respectively with total Free World oil production, OAPEC oil production, non-Arab oil production, Free World and USSR oil production, inland oil consumption, and net oil imports. In general, the time period covers the last four or five years. The remainder of the Review is made up of 31 tables, covering such disparate topics as production, capacity, reserves, trade, consumption, and stocks. Areas covered include the world, Free World, OPEC, OAPEC, OECD, selected developed countries, Western Europe, China, USSR, and Eastern Europe.

21E. Jet and Gas Turbine Engines

AD-A078 376/1 PC **A04**/MF **A01**
Cincinnati Univ OH Dept of Aerospace Engineering and Applied Mechanics
Study of Three-Dimensional Internal Flow Problems Related to Turbomachinery Flows.
Annual rept. 1 Jan-31 Dec 78,
Kirti N. Ghia, and Urmila Ghia. Feb 79, 70p AFL-79-2-46, AFOSR-TR-79-1264
Contract F49620-78-C-0041

The primary objective of this two-year research project is to develop a finite-difference numerical technique for the solution of the parabolized Navier-Stokes equations using a system of surface-oriented coordinates suitable for ducts of arbitrary geometry. An additional objective to be ful-

filled by this research consists of developing an analysis for laminar duct flow with stream wise separation using mathematical models simpler than the full Navier-Stokes equations. In order to achieve the above objectives, the following three problems have been studied during the first year of the two-year contract period: I. Laminar Flow through Joukowski ducts, II. Laminar flow through curved polar ducts, and III. Analysis of laminar streamwise flow separation via a semi-elliptic mathematical model. In each phase of the research attention is given to the accuracy of the numerical solutions as well as the efficiency with which they can be determined. For this purpose, the following two additonal areas have been studied: iv. Higher accuracy of numerical solutions, and v. Efficient numerical algorithms. Suitable model problems have been selected wherever required, in this research, with the overall goal of contributing to further the understanding of internal flows in turbomachinery. Each of the above research areas is described in this report. (Author)

AD-A078 421/5 PC **A03/MF A01**
Naval Air Propulsion Center Trenton NJ Propulsion Technology and Project Engineering Dept
Effect of Engine Operating Environments on Lubricant Load Carrying Capacity of High Gear Load Oils.
Final rept.,
P. J. Mangione. Nov 79, 34p Rept no. NAPC-PE-28

Load carrying capacity evaluations were made on current and advanced esterbased synthetic lubricants which were exposed to the operating environments of gas turbine engines. The program also investigated the cause/effect of changes in load carrying capacity as related to additive depletion and possible additive/metal interaction through an adsorption or reactive process. The results indicated that both current oils and advanced high gear load oils experienced significant degradation in load carrying capacity with time in both engine and simulated engine bearing compartment environments. The percentage loss in load carrying capacity was greater with the high gear load oils, but neither oil was significantly influenced by the engine type sampled. However, the absolute rating of the degraded XAS-2354 oil remained above the degraded MIL-L-23699 oil absolute ratings. The lower load carrying capacity of used oils, attributed to additive depletion, appeared to be recoverable with new oil additions of a high gear load oil. However, this capability would not be realized in normal operation of an engine lubrication system. An effective pre-conditioning treatment of gear tooth surfaces with a high gear load oil was demonstrated and recommended for use in the 'run-in' of new or overhauled helicopter gearboxes for improved resistance to surface damage and extended service life. (Author)

AD-A078 439/7 PC **A05/MF A01**
Pratt and Whitney Aircraft Group West Palm Beach FL Government Products Div
Investigation of Fan Blade Shroud Mechanical Damping.
Final rept. 1 Sep 77-1 Mar 79,
Donald A. Rimkunas, and H. Murray Frye. Jun 79, 79p PWA-FR-11065, AFAPL-TR-79-2054
Contract F33615-77-C-2086

This program was conducted to investigate the effect of dry friction damping at the shroud interfaces on the structural dynamic characteristics of shrouded fan blades typical of current high performance jet engines. An analytical definition of the loads generated at the shroud faces for a general stick-slip condition was developed. The analytical load description includes the elastic case of a stuck or locked shroud as well as the case of a slipping shroud. These loads were used in a nonlinear steady-state vibration analysis of the shrouded blade. Controlled vibration testing of the first-stage fan blade with a trailing edge shroud of a YF100 (prototype) turbofan engine was conducted. The blade was tested with variable shroud restraints to simulate the full range of boundary conditions from freely slipping to fully locked, including the intermediate condition of micro-slipping. The testing of the blade with a freely slipping shroud was inconclusive because of repeatability problems. Good agreement was found between the nonlinear analysis and test data for the stuck and micro-slip boundary conditions. (Author)

AD-A078 440/5 PC **A09/MF A01**
General Electric Co Cincinnati OH Aircraft Engine Group
Evaluation of Fuel Character Effects on J79 Engine Combustion System.
Final technical rept. 7 Jun 77-31 Aug 78,
C. C. Gleason, T. L. Oller, M. W. Shayeson, and D. W. Bahr. Jun 79, 198p R79AEG321, AFAPL-TR-79-2015, CEEDO-TR-79-06
Contract F33615-77-C-2042

Results of a program to determine the effects of broad variations in fuel properties on the performance, emissions, and durability of the J79-17A turbojet engine combustion system are presented. Combustor tests conducted at engine idle, takeoff, subsonic cruise, supersonic dash, cold day ground start, and altitude relight operating conditions with 13 different fuels are described. The test fuels covered a range of hydrogen contents (12.0 to 14.5 percent), aromatic type (monocyclic and bicyclic), initial boiling point (285 to 393 K), final boiling point (552 to 679 K) and viscosity (0.83 to 3.25 mm2/s at 300 K). At high power operating conditions, fuel hydrogen content was found to be a very significant fuel property with respect to linear temperature, flame radiation, smoke, and NO sub x emission levels. Carbon monoxide and HC emissions were very low at these conditions with all of the fuels. At engine idle operating conditions, CO, HC, and NO sub x emission levels were found to be independent of fuel hydrogen content, but a small effect of fuel volatility and/or viscosity was found. At cold day ground start conditions (to 329 K) light-off was obtained with all fuels, but the required fuel-air ratio increased with the more viscous fuels. At altitude conditions, the current engine relight limits with JP-4/JP-5 fuel were essentially met or exceeded with all of the JP-4 or JP-8 based fuel blends. However, a very significant reduction in altitude relight capability was found when a No. 2 diesel fuel was tested.

AD-A078 529/5 PC **A04/MF A01**
Airesearch Mfg Co of Arizona Phoenix
Demonstration Program for a Flexible Duct Valve for Ramjet Engine Fuel Controls.
Final rept. 15 Nov 78-28 Feb 79,
James S. Roundy. 14 Sep 79, 67p 41-2226, NADC-77136-60
Contract N62269-77-C-0352

A demonstration program was conducted to develop a flex duct-type metering valve for use in the fuel control of ramjet engines for Navy missiles. This type valve has inherent advantages of simplicity, low cost, and high reliability that make it particularly attractive for this application. This type valve functions best when the leakage flow from the metering gap is bypassed back upstream of the fuel pump. (Author)

AD-A078 593/1 PC **A07/MF A01**
Airesearch Mfg Co of Arizona Phoenix
Hot Isostatic Pressing Rejuvenation of Disks.
Final technical rept. 1 Sep 77-31 May 79,
David V. Sundberg, and Donal H. Comey. Jul 79, 139p 21-3238, AFML-TR-79-4093
Contract F33615-77-C-5113

Retired field-service Ti-6Al-4V compressor disks and Waspaloy turbine disks from Garrett-AiResearch auxiliary power units were secured for the program test material. They were given a thorough dimensional inspection, nondestructive evaluation (NDE) and metallurgical characterization including mechanical properties and evaluation of microstructures. Baseline low-cycle-fatigue (LCF) lives for these disks were determined by cyclic-spin testing and periodic inspection of new disks. Cleaning and crack bridging techniques were evaluated on the disk materials and reverse-sputter cleaning combined with ion plating was chosen for the preparation of cracked disks prior to hot isostatic pressing (HIP). The HIP parameters were selected for each alloy and the disks were fixtured, protected from excessive oxidation, and HIPped using pressurized argon gas. The Ti-6Al-4V compressor disks were evaluated in the HIPped condition, while the Waspaloy disks were given a post-HIP heat treatment.

AD-A078 669/9 PC **A05/MF A01**
General Electric Co Cincinnati OH Aircraft Engine Group
Novel Ceramic Turbine Rotor Concept.
Final technical rept. 22 Sep 78-22 May 79,
L. J. Stoffer. Sep 79, 93p R79AEG527, AFAPL-TR-79-2074
Contract F33615-78-C-2041

A novel design concept for a ceramic turbine rotor has been studied in detail for a non-man-rated, limited-life gas turbine engine application. The feature of the design involves keeping the rotating ceramic components in a compression state at all turbine operating conditions. An air-cooled composite material containment hoop is utilized at the outer diameter of ceramic air-cooled fins which support ceramic turbine blades in compression against a radially compliant wheel. The design study of this Compression Structured Ceramic Turbine Rotor included detailed material, heat transfer, and 3-D stress analyses. The study effort also looked at the operational limits of the design and a performance and economic analysis comparison to a baseline metal design. Conclusions and recommendations for future development are also presented in this report. (Author)

AD-A078 670/7 PC **A09/MF A01**
Systems Control Inc Palo Alto CA
Variable Cycle Engine Multivariable Control Synthesis (Control Structure Definition).
Interim rept. 1 Sep 77-31 Aug 78,
Stephen M. Rock, and Ronald L. De Hoff. Feb 79, 179p AFAPL-TR-79-2043
Contract F33615-77-C-2096

The variable cycle aircraft turbine engine, GE23-JTDE, represents a prototype of future multimode propulsion plants. It is a sophisticated design of highly variable geometry and multiple control inputs. To control this engine, a large number of engine variables must be sensed. These include engine pressures, temperatures, rotor speeds, and airframe and inlet commands. A controller for this engine must therefore be multivariable (i.e. manipulating large numbers of input and output variables) and multifunctional (i.e. perform, in addition to control logic, data conditioning and fault diagnosis). The development of such a full authority digital electronic controller must utilize demonstrated multivariable design techniques to integrate adequately these complex system functions. A preliminary design of a controller for this variable cycle engine is described. It is implementable on a small digital computer (less than 16K words of storage), and is modular in design (subroutine format). Specific controller functions of transient regulation, steady state regulation, trajectory generation, signal processing, and fault detection and accommodation are incorporated in a way which allows experimentation with different techniques for each function without affecting the overall structure. Promising techniques for implementing each function are discussed. (Author)

AD-A078 779/6 PC **A03/MF A01**
Environmental Engineering Consultants Gainesville FL
Aerosol Filter Loading Data for a Simulated Jet Engine Test Cell Aerosol.
Final rept. Jan-Jul 79,
Dale A. Lundgren. Aug 79, 44p AFESC/ESL-TR-79-28
Contract F08637-79-M-0784

The Air Force routinely tests turbine engines in fixed test cells, some of which have been cited by state pollution control officials for violations of opacity regulations. A previous theoretical study, CEEDO-TR-78-53, predicted that relatively low efficiency and low cost techniques could bring jet engine test cells into compliance with air pollution regulations. The system proposed included a water cooling spray and a mist eliminator followed by a medium efficiency, high velocity, throw-away type glass filter media. The most serious limitation of which velocity filtration is the aerosol mass loading the potential for rapid pressure drop build up across the filter. Since filter loading characteristics could not be theoretically predicted, the objective of this follow-on work was to experimentally test and report the filter loading characteristics of glass fiber filters for possible application to jet engine test cell exhaust plume opacity control. Two types of glass fiber media were tested: (1) two different medium efficiency pre-filter media, and (2) two different high efficiency final filter media.

AD-A078 837/2 PC **A03**/MF **A01**
Princeton Univ NJ Dept of Mechanical and Aerospace Engineering
Evaluation of Candidate Metals in a Simulated Space Shuttle Main Engine Environment for Application as Turbine Blade Dampers.
Final rept.,
Leonard H. Caveny, and Samuel O. Morris. May 79, 37p Rept no. MAE-1436
Contract NAS8-33102

The high-pressure pumps for the space shuttle main engine are driven by combustion products which are 50% H2 and 50% H2O (by weight). The Haynes alloy 188, used in the dampers, has experienced erosion. The purpose of the study was to evaluate the erosion producing characteristics of wet H2 using a controlled environment produced by a ballistic compressor. Four candidate materials were evaluated: H-188, A-286, Pt/Rh and Rh. Rh was clearly the most erosion resistant. Comparisons with AISI 4340 and Fe specimens of known uniformity indicate that metallurgical defects in the candidate materials are primary contributors to the higher than usual erosion. (Author)

AD-A078 956/0 PC **A19**/MF **A01**
American Inst of Aeronautics and Astronautics New York
International Symposium on Air Breathing Engines (4th), held at Lake Buena Vista, Orlando, Florida 1-6 April 1979.
1979, 429p
Grant N00014-77-G-0069

Partial Contents: Inlet Flow Distortion; Operations/Cost/Maintenance; Aeroelasticity/Vibrations; Systems Integration; Fuels and Combustion; 3-Dimensional Flow and Boundary Layer/Shock Separation; Component Developements Compressors; AND Ramjets.

N80-14113/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Digital System for Dynamic Turbine Engine Blade Displacement Measurements.
L. J. Kiraly. 13 Mar 79, 13p NASA-TM-81382, E-288
Conf-Proposed for Presentation at 25TH Ann. Intern. Gas Turbine Conf. And the 22D Ann. Fluids Engr. Conf., New Orleans, 9-13 Mar. 1980; Sponsored by AM. Soc. Of Mech. Engr.

An instrumentation concept for measuring blade tip displacements which employs optical probes and an array of micro-computers is presented. The system represents a hitherto unknown instrumentation capability for the acquisition and direct digitization of deflection data concurrently from all of the blade tips of an operational engine rotor undergoing flutter or forced vibration. System measurements are made using optical transducers which are fixed to the case. Measurements made in this way are the equivalent of those obtained by placing three surface-normal displacement transducers at three positions on each blade of an operational rotor.

N80-14116/1 PC **A04**/MF **A01**
General Electric Co., Cincinnati, OH. Advanced Engineering and Technology Programs Dept.
Quiet Clean Short-Haul Experimental Engine (Qcsee). Under-the-Wing (Utw) Engine Boilerplate Nacelle Test Report. Volume 2: Aerodynamics and Performance.
31 Dec 77, 61p NASA-CR-135250, R77AEG2122-V-2
Contract NAS3-18021

The initial phase of testing of the under the wing engine and boilerplate nacelle components is discussed. The aerodynamics and performance are outlined.

N80-14119/5 PC **A04**/MF **A01**
General Electric Co., Cincinnati, OH. Advanced Engineering and Technology Programs Dept.
Quiet Clean Short-Haul Experimental Engine (Qcsee) under-the-Wing (Utw) Graphite/Pmr Cowl Development.
C. L. Ruggles. Jul 78, 75p NASA-CR-135279, R78AEG206
Contract NAS3-18021

The PMR process development, tooling concepts, testing conducted to generate materials properties data, and the fabrication of a subscale model of the inner cowl are presented. It was concluded that the materials, processes, and tooling concepts were satisfactory for making an inner cowl with adequate structural integrity.

N80-14120/3 PC **A03**/MF **A01**
General Electric Co., Cincinnati, OH. Advanced Engineering and Technology Programs Dept.
Quiet Clean Short-Haul Experimental Engine (Qcsee) over-the-Wing (Otw) Propulsion System Test Report. Volume 2: Aerodynamics and Performance.
Jul 78, 49p NASA-CR-135324, R77AEG474-V-2
Contract NAS3-18021

The design and testing of the over the wing engine, a high bypass, geared turbofan engine, are discussed. The propulsion system performance is examined for uninstalled performance and installed performance. The fan aerodynamic performance and the D nozzle and reverser thrust performance are evaluated.

N80-14121/1 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Static Test-Stand Performance of the YF-102 Turbofan Engine with Several Exhaust Configurations for the Quiet Short-Haul Research Aircraft (Qsra).
J. G. Mcardle, L. Homyak, and A. S. Moore. Nov 79, 62p NASA-TP-1556, E-019

The performance of a YF-102 turbofan engine was measured in an outdoor test stand with a bellmouth inlet and seven exhaust-system configurations. The configurations consisted of three separate-flow systems of various fan and core nozzle sizes and four confluent-flow systems of various nozzle sizes and shapes. A computer program provided good estimates of the engine performance and of thrust at maximum rating for each exhaust configuration. The internal performance of two different-shaped core nozzles for confluent-flow configurations was determined to be satisfactory. Pressure and temperature surveys were made with a traversing probe in the exhaust-nozzle flow for some confluent-flow configurations. The survey data at the mixing plane, plus the measured flow rates, were used to calculate the static-pressure variation along the exhaust nozzle length. The computed pressures compared well with experimental wall static-pressure data. External-flow surveys were made, for some confluent-flow configurations, with a large fixed rake at various locations in the exhaust plume.

N80-14123/7 PC **A06**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Dynamic Response of a Mach 2.5 Axisymmetric Inlet and Turbojet Engine with a Poppet-Value Controlled Inlet Stability Bypass System when Subjected to Internal and External Airflow Transients.
B. W. Sanders. Jan 80, 102p NASA-TP-1531, E-9467

The throat of a Mach 2.5 inlet that was attached to a turbojet engine was fitted with a poppet-valve-controlled stability bypass system that was designed to provide a large, stable airflow range. Propulsion system response and stability bypass performance were determined for several transient airflow disturbances, both internal and external. Internal airflow disturbances included reductions in overboard bypass airflow, power lever angle, and primary-nozzle area as well as compressor stall. For reference, data are also included for a conventional, fixed-exit bleed system. The poppet valves greatly increased inlet stability and had no adverse effects on propulsion system performance. Limited unstarted-inlet bleed performance data are presented.

N80-14124/5 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Turbojet-Exhaust-Nozzle Secondary-Airflow Pumping as an Exit Control of an Inlet-Stability Bypass System for a Mach 2.5 Axisymmetric Mixed-Compression Inlet.
B. W. Sanders. Jan 80, 82p NASA-TP-1532, E-9468

The throat of a Mach 2.5 inlet that was attached to a turbojet engine was fitted with large, porous bleed areas to provide a stability bypass system that would allow a large, stable airflow range. Exhaust-nozzle, secondary-airflow pumping was used as the exit control for the stability bypass airflow. Propulsion system response and stability bypass performance were obtained for several transient airflow disturbances, both internal and external. Internal airflow disturbances included reductions in overboard bypass airflow, power lever angle, and primary-nozzle area, as well as compressor stall. Nozzle secondary pumping as a stability bypass exit control can provide the inlet with a large stability margin with no adverse effects on propulsion system performance.

N80-14126/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Nasa Broad-Specification Fuels Combustion Technology Program: Status and Description.
J. S. Fear. 1979, 14p NASA-TM-79315, E-272
Conf-Presented at 25TH Ann. Intern. Gas Turbine Conf., New Orleans, 9-13 Mar. 1980; Sponsored by AM. Soc. Of Mech. Engr.

The program presented is a contracted effort to evolve and demonstrate the technology required to utilize broad-specification fuels in current and next generation commercial Conventionel Takeoff and Landing aircraft engines, and to verify this technology in full-scale engine tests in 1983. The program consists of three phases: Combustor Concept Screening, Combustor Optimization Testing, and Engine Verification Testing. The development and screening of the combustion system designs for the CF6-80 engine and the JT9D-7 engine, respectively, in high-pressure sector test rigs are reported.

N80-14127/8 PC **A07**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
The CF6 Jet Engine Performance Improvement: New Front Mount.
W. A. Fasching. Dec 79, 139p NASA-CR-159639, R79AEG366
Contract NAS3-20629

The New Front Mount was evaluated in component tests including stress, deflection/distortion and fatigue tests. The test results demonstrated a performance improvement of 0.1% in cruise sfc, 16% in compressor stall margin and 10% in compressor stator angle margin. The New Front Mount hardware successfully completed 35,000 simulated flight cycles endurance testing.

N80-14128/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Laser-Optical Blade Tip Clearance Measurement System.
J. P. Barranger, and M. J. Ford. 13 Mar 79, 10p NASA-TM-81376
Conf-Proposed for Presentation at 25TH Ann. Intern. Gas Turbine Conf. And the 22D Ann. Fluids Engr. Conf., New Orleans, 9-13 Mar. 1980; Sponsored by AM. Soc. Of Mech. Engr.

A laser-optical measurement system was developed to measure single blade tip clearances and average blade tip clearances between a rotor and its gas path seal in rotating component rigs and complete engines. The system is applicable to fan, compressor and turbine blade tip clearance measurements. The engine mounted probe is particularly suitable for operation in the extreme turbine environment. The measurement system consists of an optical subsystem, an electronic subsystem and a computing and graphic terminal. Bench tests and environmental tests were conducted to confirm operation at temperatures, pressures, and vibration levels typically encountered in an operating gas turbine engine.

N80-14129/4 PC **A14**/MF **A01**
Detroit Diesel Allison, Indianapolis, IN.

Study of Turboprop Systems Reliability and Maintenance Costs.
Final Report.
Jun 78, 304p NASA-CR-135192, EDR-9132
Contract NAS3-20057

The overall reliability and maintenance costs (R&MC's) of past and current turboprop systems were examined. Maintenance cost drivers were found to be scheduled overhaul (40%), lack of modularity particularly in the propeller and reduction gearbox, and lack of inherent durability (reliability) of some parts. Comparisons were made between the 501-D13/54H60 turboprop system and the widely used JT8D turbofan. It was found that the total maintenance cost per flight hour of the turboprop was 75% higher than that of the JT8D turbofan. Part of this difference was due to propeller and gearbox costs being higher than those of the fan and reverser, but most of the difference was in the engine core where the older technology turboprop core maintenance costs were nearly 70 percent higher than for the turbofan. The estimated maintenance cost of both the advanced turboprop and advanced turbofan were less than the JT8D. The conclusion was that an advanced turboprop and an advanced turbofan, using similar cores, will have very competitive maintenance costs per flight hour.

N80-14131/0 PC **A05/MF A01**
Universal Systems, Inc., Arlington, VA.
Oblique Detonation Wave Ramjet.
R. B. Morrison. Jan 80, 87p NASA-CR-159192
Contract NAS1-15344

Two conceptual designs of the oblique detonation wave ramjet are presented. The performance is evaluated for stoichiometric hydrogen-air equivalence ratios of phi = 1/3, 2/3 and 1 for a range of flight Mach numbers from 6 to 10.

N80-14374/6 PC **A02/MF A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Temperature and Pressure Measurement Techniques for an Advanced Turbine Test Facility.
F. G. Pollack, and R. P. Cochran. 1980, 12p NASA-TM-79278, E-212
Conf-Proposed for Presentation at the Intern. Gas Turbine Conf. And Ann. Fluids Engr. Conf., New Orleans, 9-13 Mar. 1980; Sponsored by AM. Soc. Mech. Engr.

A high pressure, high-temperature turbine test facility constructed for use in turbine cooling research is described. Several recently developed temperature and pressure measuring techniques are used in this facility. The measurement techniques, their status, previous applications and some results are discussed. Noncontact surface temperature measurements are made by optical methods. Radiation pyrometry principles combined with photoelectric scanning are used for rotating components and infrared photography for stationary components. Contact (direct) temperature and pressure measurements on rotating components are expected to be handled with an 80 channel rotary data package which mounts on and rotates with the turbine shaft at speeds up to 17,500 rpm. The data channels are time-division multiplexed and converted to digital words in the data package. A rotary transformer couples power and digital data to and from the shaft.

PATENT-4 180 329 Not available NTIS
Department of the Air Force Washington DC
Single Blade Proximity Probe.
Patent,
James R. Hildebrand. Filed 23 Mar 78, patented 25 Dec 79, 3p AD-D006 790/0, PAT-APPL-889 795
Supersedes PAT-APPL-889 795-78, AD-D004 941.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A single blade proximity probe uses fiber optics to direct a laser output at turbine engine blades and to return the reflected light to an image intensifier probe which provides an output indicative of blade clearance. To enable the system to measure the clearance of a single blade tip on an operating turbine, a second light beam having a different wavelength from the laser output is directed over the laser light path to count the blades and to strobe the laser on the desired blade. (Author)

21H. Rocket Motors and Engines

AD-A078 412/4 PC **A06/MF A01**
Arnold Engineering Development Center Arnold AFS TN
Bipropellant Engine Plume Contamination Program. Volume I. Chamber Measurements. Phase I.
Final rept. 5 Sep-12 Dec 77,
R. E. Alt, J. A. Roux, B. E. Wood, D. F. Frazine, and R. Dawbarn. Dec 79, 103p Rept no. AEDC-TR-79-28-VOL-1
Original contains color plates: All DTIC and NTIS reproductions will be in black and white. See also Volume 2, AD-A077 435.

An experimental program to measure the mass flux in the backflow region of a 5-lbf bipropellant thruster at angles up to 147 deg with respect to the plume centerline using temperature-controlled and temperature-compensated quartz crystal microbalances (QCM'S) is presented. The measurements were conducted in a high vacuum cryogenic chamber (Aerospace Chamber 10V) at AEDC. Gaseous helium and liquid helium cryopanels provided a blank-off pressure in the ten to the minus 6th power torr range and maintained the background pressure in the ten to the minus 5th power torr range while pulse firing the motor (25- to 100-msec pulse width, 1- to 10-percent duty cycle). Chamber recovery time was a few tenths of a second. Several motor configurations and operating conditions were compared for potential contamination effects.

AD-A078 729/1 PC **A06/MF A01**
Tennessee Technological Univ Cookeville
Analysis of Combustion Instability in Liquid Fuel Rocket Motors.
Topical rept.,
K. Wong, J. Peddieson, Jr., and M. Ventrice. Nov 79, 119p NASA-CR-159733
Grant NGR-43-003-015

The primary objective of this study is the development of a new analytical technique to be used in the solution of nonlinear velocity-sensitive combustion instability problems. Such a method should be relatively easy to apply and should require relatively little computation time. In an attempt to achieve this aim, the orthogonal collocation method is investigated first. However, it is found that the results are heavily dependent on the location of the collocation points and characteristics of the equations. Therefore, the method is rejected as unreliable. Next, the Galerkin method, which has proved to be very successful in analysis of the pressure sensitive combustion instability, is considered. This method is found to work very well. It is found that the pressure wave forms exhibit a strong second harmonic distortion and a variety of behaviors are possible depending on the nature of the combustion process and the parametric values involved. Finally, a one-dimensional model provides further insight into the problem by allowing a comparison of Galerkin solutions with more exact finite-difference computations. (Author)

N80-14189/8 PC **A18/MF A01**
Aerojet Liquid Rocket Co., Sacramento, CA.
Performance of a Transpiration-Regenerative Cooled Rocket Thrust Chamber.
Final Report.
H. W. Valler. Sep 79, 414p NASA-CR-159742
Contract NAS3-21029

The analysis, design, fabrication, and testing of a liquid rocket engine thrust chamber which is gas transpiration cooled in the high heat flux convergent portion of the chamber and water jacket cooled (simulated regenerative) in the barrel and divergent sections of the chamber are described. The engine burns LOX-hydrogen propellants at a chamber pressure of 600 psia. Various transpiration coolant flow rates were tested with resultant local hot gas wall temperatures in the 800 F to 1400 F range. The feasibility of transpiration cooling with hydrogen and helium, and the use of photo-etched copper platelets for heat transfer and coolant metering was successfully demonstrated.

21I. Rocket Propellants

AD-A078 691/3 PC **A04/MF A01**
Florida Univ Gainesville Dept of Chemistry
Investigation of Thermoplastic Elastomers as Propellant Binders.
Final rept. 1 Jun 76-31 Aug 79,
George B. Butler. 29 Nov 79, 72p ARO-13960.4-CX
Grant DAAG29-76-G-0223

It was the objective of the present investigation to conduct a fundamental study of the feasibility of utilizing or developing suitable thermoplastic elastomers for use in propellant technology, and considerable progress has been made toward achieving this objective. A wide variety of thermoplastic elastomers of novel structure have been synthesized, and their fundamental physical properties determined. As a result of this study, a number of carefully selected samples were submitted to personnel at Redstone Arsenal, Alabama for evaluation as thermoplastic propellant binders. Verbal communication has strongly indicated that the present approach is a feasible one, and has made it possible to extrapolate to a set of 'necessary' properties of the material to meet the required objectives. (Author)

AD-A078 730/9 PC **A08/MF A01**
Tennessee Technological Univ Cookeville
Stability Analysis of a Liquid Fuel Annular Combustion Chamber,
Gary H. McDonald, John Peddieson, Jr., and M. Ventrice . Nov 79, 151p NASA-CR-159734
Grant NGR-43-003-015

High frequency combustion instability continues to be a major problem in the development and operation of rocket engines. Most mathematical models simulating this phenomena involve the derivation and solution of complex non-linear differential equations. In an effort to overcome the mathematical difficulties associated with the solution of the nonlinear combustion instability problems, two methods of analysis were developed. In investigating the problems of combustion instability in an annular combustion chamber, a modified Galerkin method was used to produce a set of modal amplitude equations from the general nonlinear partial differential acoustic wave equation. From these modal amplitude equations, the two-variable perturbation method was used to develop a set of approximate equations of a given order of magnitude. These equations were modeled to show the effects of velocity sensitve combustion instabilities by evaluating the effects of certain parameters in the given set of equations. From evaluating these effects, one can ascertain which parameters cause instabilities to occur in the combustion chamber. In this analysis, it is assumed that in the annular combustion chamber, the liquid propellants are injected uniformly across the injector face, the combustion processes are distributed throughout the combustion chamber and that no time delay occurs in the combustion processes. (Author)

AD-A078 777/0 MF **A01**
Ogden Air Logistics Center Hill AFB UT Propellant Lab Section
Propellant Surveillance Report LGM-30 F & G Stage 1 Phase E, Series VIII (TP-H1011).
Semi-annual rept.,
John A. Thompson. Oct 79, 137p Rept no. MANCP-423(79)
Availability: Microfiche copies only.

This report contains propellent test results from cartons of TP-H1011 bulk propellant representing LGM-30 F and G First Stage Mineuteman Motors. This report uses a statistical approach to analyze the bulk carton propellant data. Testing was accomplished in accordance with MMWRM Project M82934C-WNL17514. The data from this test period are combined with data from previous testing and entered into the GO85 computer for storage, analysis and regression analysis. From the statistical analysis of all data tested to date (thirteen and one-half years for F and G), significant

degradation of the propellant does not appear likely for at least two years past the oldest data point. Each point on the regression plot represents the mean of all samples at that particular age. The number of samples at each point is indicated on the sample size summary sheet on the page accompanying each regression plot or group of regression plots. The data range at any age can be found by suitable inquiry of the G085 system. (Author)

AD-A078 778/8 PC **A03/MF A01**
Ogden Air Logistics Center Hill AFB UT Propellant Lab Section
Propellant Surveillance Report LGM-30 A, B, F & G, Stage I, TP-H1043 Aft Closure Propellant.
Semi-annual rept.,
John A. Thompson. Nov 79, 33p Rept no. MANCP-424(79)

This report contains propellant test results from cartons of TP-H1043 propellant representing selected batches used in the aft closure of First Stage Minuteman Motors. Data from TP-H1043 propellant obtained from the aft closures of the LGM-30 A, B, F and G Motors are reported in regression analyses for the fifth time and the fourth time using the G085 computer system. Testing was accomplished in accordance with MMWRM Project M82934C. An analysis of all parameters indicate that no significant degradation is anticipated for at least two years past the oldest data point. Each point on the regression plot represents all samples at that particular age. The number of samples at each point is indicated on the sample size summary sheet on the page accompanying each regression plot. The data range at any age can be found by suitable inquiry of the G085 system. (Author)

AD-A078 845/5 PC **A03/MF A01**
Sri International Menlo Park CA
Deflagration-to-Detonation Transition in HMX-Based Propellants.
Interim rept. 1 May 78-30 Apr 79,
M. Cowperthwaite, W. J. Murri, and J. T. Rosenberg. Aug 79, 27p AFOSR-TR-79-1286
Contract F49620-77-C-0039

Theoretical and experimental studies were undertaken to explain the mechanisms that establish conditions for the occurrence of the one-dimensional deflagration-to-detonation transition (DDT), and to formulate a satisfactory model for a quantitative description of this transition. The theoretical studies were concerned with the thermo-hydrodynamic treatment of DDT. The central problem is to model the propagation of the unsteady flame and the flow it produces ahead of the flame front. The compressive flows produced by an accelerating flame and by an accelerating piston were compared to provide a better physical understanding of the compressive action of an accelerating flame; conditions for shock formation in a compressive flow were formulated. The condition for shock formation in the compressed state is that the second derivative of the Lagrange pressure-specific volume compression curve be positive. When this condition is satisfied, a shock is always formed by an accelerating piston but not always by an accelerating flame. As the piston accelerates, the compression waves emanating from it overtake each other and coalesce to form a shock. But the accelerating flame can overtake and consume compressed material before the compression waves emanating from it coalesce to form a shock. In the experimental study, an assembly was designed to allow incorporation of stress gages into propellant charges during the casting process, thereby eliminating the expensive machining and grooving operations conventionally used in constructing targets for langrange gage experiments.

AD-A078 904/0 PC **A03/MF A01**
Air Force Rocket Propulsion Lab Edwards AFB CA
An Investigation of Particle Size Distribution Using Laser Holography of Burning Solid Propellant.
Final rept. Nov 77-30 Sep 78,
Michael J. Adams, and T. W. Owens. Sep 79, 43p Rept no. AFRPL-TR-79-48

A test area was modified to allow holographic recordings to be made of burning solid propellant samples as contained in a pressurized window bomb. A holographic reconstruction area was also established. An attempt was made to develop a semi-automated holographic data retrieval (HDR) system using existing AFRPL hardware. The purpose of the HDR system was to retrieve particle size and positions information in a timely manner from holographic reconstructions of the propellant combustion. Experiments with the HDR system revealed serious deficiencies in the areas of resolution and particle recognition. Since a primary goal of the program was to establish particle distribution correlations from holographically derived particle information, the present program has been inactivated pending the development and acquisition of an improved HDR system. (Author)

22. SPACE TECHNOLOGY

22A. Astronautics

AD-A078 675/6 PC **A03/MF A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Photometry of Artificial Satellites Application to the Ground Electro-Optical Deep Space Surveillance (GEODSS) Program.
Technical note,
John M. Sorvari. 9 Oct 79, 50p TN-1979-61, ESD-TR-79-261
Contract F19628-80-C-0002

This note defines the basic concept of an astronomical photometric system and examines it in the context of the GEODSS program. Several different systems are developed, each to fit a particular part of the overall mission for photometry in the GEODSS program. The different kinds of errors arising in each system are examined and their impact upon the goals of GEODSS photometry is assessed. Of particular note is the role of aliasing in the photometry of artificial satellites. It is concluded that if care is taken, photometry can be a useful part of the GEODSS program. (Author)

N80-14163/3 PC **A03/MF A01**
National Aeronautics and Space Administration, Langley Station, VA. Langley Research Center.
Determination of ASPS Performance for Large Payloads in the Shuttle Orbiter Disturbance Environment.
C. R. Keckler, K. S. Kibler, and L. F. Powell. Oct 79, 37p NASA-TM-80136

A high fidelity simulation of the annular suspension and pointing system (ASPS), its payload, and the shuttle orbiter was used to define the worst case orientations of the ASPS and its payload for the various vehicle disturbances, and to determine the performance capability of the ASPS under these conditions. The most demanding and largest proposed payload, the Solar Optical Telescope was selected for study. It was found that, in all cases, the ASPS more than satisfied the payload's requirements. It is concluded that, to satisfy facility class payload requirements, the ASPS or a shuttle orbiter free-drift mode (control system off) should be utilized.

N80-14165/8 PC **A08/MF A01**
Centre National d'Etudes Spatiales, Toulouse (France).
French Space Programs Programme Spatial Francais. Rapport au Cospar.
1979, 154p
Subm-Prepared in Cooperation with Comite Natl. Franc. De Rech. Dans l'Espace, Paris. Conf-Presented at 22D Cospar Assembly, Bangalore, India, May - Jun. 1979. Text in French; English Summary.

French activites during 1979 in space research and correlated programs are summarized. The work accomplished in the fields of astronomy, solar system, planet studies, interplanetary medium, ionosphere and magnetospheric physics, aeronomy, meteorology, earth resources, geodesy, life sciences, and material sciences are discussed.

N80-14169/0 PC **A08/MF A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Torque Equilibrium Attitude Control for Skylab Reentry.
J. R. Glaese, and H. F. Kennel. Nov 79, 173p NASA-TM-78252

All the available torque equilibrium attitudes (most were useless from the standpoint of lack of electrical power) and the equilibrium seeking method are presented, as well as the actual successful application during the 3 weeks prior to Skylab reentry.

N80-14177/3 PC **A06/MF A01**
National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, FL.
Space Transportation System Shuttle Turnabout Analysis Report.
R. E. Reedy. 14 Aug 79, 151p NASA-TM-80840

The progress made and the problems encountered by the various program elements of the shuttle program in achieving the 160 hour ground turnaround goal are presented and evaluated. Task assessment time is measured against the program allocation time.

N80-14971/9 PC **A06/MF A01**
National Aeronautics and Space Administration, Washington, DC.
A Review of NASA International Programs.
1 Jan 79, 112p NASA-TM-80845

A synoptic overview of NASA's international activities to January 1979 is presented. The cooperating countries and international organizations are identified. Topics covered include (1) cooperative arrangements for ground-based, spaceborne, airborne, rocket-borne, and balloon-borne ventures, joint development, and aeronautical R & D; (2) reimbursable launchings; (3) tracking and data acquisition; and (4) personnel exchanges. International participation in NASA's Earth resources investigations is summarized in the appendix. A list of automatic picture transmission stations is included.

22B. Spacecraft

AD-A078 615/2 PC **A07/MF A01**
National Aeronautics and Space Administration Langley Station VA Langley Research Center
Effects of Relaxed Static Longitudinal Stability on a Single-Stage-to-Orbit Vehicle Design.
Technical paper,
Delma C. Freeman, Jr., and Alan W. Wilhite. Dec 79, 138p NASA-L-13243, NASA-TP-1594

The effects of relaxing longitudinal stability requirements on single-stage-to-orbit space vehicles were studied by comparing the mass and performance characteristics of two vehicles, one designed for positive levels of longitudinal stability and the other designed with relaxed stability requirements in a computer-aided design process. Both vehicles were required to meet the same mission characteristics. Wind-tunnel tests were conducted over a Mach number range from 0.3 to 4.63 to verify estimated aerodynamic characteristics. (Author)

N80-14176/5 PC **A04/MF A01**
Martin Marietta Corp., Denver, CO.
Thermal Protection System Flight Repair Kit.
Final Report.
Dec 79, 75p NASA-CR-160417, MCR-79-682
Contract NAS9-15969

A thermal protection system (TPS) flight repair kit required for use on a flight of the Space Transportation System is defined. A means of making TPS repairs in orbit by the crew via extravehicular activity is discussed. A cure in place ablator, a precured ablator (large area application), and packaging design (containers for mixing and dispensing) for the TPS are investigated.

N80-14179/9 PC **A05/MF A01**
McDonnell-Douglas Astronautics Co., Huntington Beach, CA.
Shuttle Orbiter Tps Flight Repair Kit Development.
Final Report.
Dec 79, 100p NASA-CR-160416, MDC-G8261
Contract NAS9-15971

The design and application of a TPS repair kit is presented. The repair kit is designed for on orbit use by a crew member working in the manned maneuvering unit (MMU). The kit includes the necessary equipment and materials to accomplish the

repair tasks which include the following: HRSI emittance coating repair, damaged tile repair, missing tile repair, and multiple tile repair. Two types of repair materials required to do the small area repair and the large area repair are described. The materials area cure in place, silicone base ablator for small damaged areas and precured ablator tile for repair of larger damaged areas is examined. The cure in place ablator is also used as an adhesive to bond the precured tiles in place. An applicator for the cure in place ablator, designed to contain a two-part silicon compound, mix the two components at correct ratio, and dispense the materials at rates compatible with mission timelines established for the EVA is described.

N80-14181/5 PC **A07**/MF **A01**
General Electric Co., Philadelphia, PA. Re-entry and Environmental Systems Div.
Thermal Protection System Repair Kit Program.
Final Report.
28 Nov 79, 145p NASA-CR-160418, REPT-79SDR2310
Contract NAS9-15970

The feasibility and conceptual design aspects of repair materials and procedures for in orbit repair of the space shuttle orbiter TPS tiles are investigated. Material studies to investigate cure in place materials are described including catalyst and cure studies, ablation tests and evaluations, and support mixing and applicator design. The feasibility of the repair procedures, the storage of the TPS, dispensing, and cure problems are addressed.

N80-14184/9 PC **A07**/MF **A01**
Acurex Corp., Mountain View, CA.
Galileo Probe Thermal Protection: Entry Heating Environments and Spallation Experiments Design.
Final Report.
A. Balakrishnan, W. Nicolet, S. Sandhu, and J. Dodson. Nov 79, 133p NASA-CR-152334, FR-79-21/AS
Contracts NAS2-9909, ACUREX PROJ. 7396

A valid procedure was developed for predicting wall heating and ablation rates about the probe forebody. Entropy layer effects on convective heating rate were analyzed and the computed results are given. A feasibility study to perform an experiment, the selection of a candidate test facility, and the definition of a test matrix are described. The material selection, fabrication, and evaluation of the metal containing carbon-carbon composites for use on the Galileo probe are summarized. The effect of various Jovian atmospheric models on entry heating environment is considered as well as the effect of the nonspherical shape of the planet on entry trajectory.

N80-14185/6 PC **A05**/MF **A01**
Thermacore, Inc., Leola, PA.
Meteoroid Protection Methods for Spacecraft Radiators Using Heat Pipes.
Final Report.
D. M. Ernst. Nov 79, 99p NASA-CR-162545
Contract JPL-955437

Various aspects of achieving a low mass heat pipe radiator for the nuclear electric propulsion spacecraft were studied. Specific emphasis was placed on a concept applicable to a closed Brayton cycle power sub-system. Three aspects of inter-related problems were examined: (1) the armor for meteoroid protection, (2) emissivity of the radiator surface, and (3) the heat pipe itself. The study revealed several alternatives for the achievement of the stated goal, but a final recommendation for the best design requires further investigation.

N80-14187/2 PC **A06**/MF **A01**
European Space Research and Technology Center, Noordwijk (Netherlands). Product Assurance Div.
Guidelines for Space Materials Selection.
Jul 79, 120p ESA-PSS-07/QRM-01-ISSUE-5

The different classes of materials used in spacecraft manufacture are reviewed, their chemical nature and physical aspects are described, and processing and assembly methods are considered. Precautions to be taken and materials to be avoided are emphasized for each class. General effects of the space environment are also described. Some individual materials which are suitable for space application under certain conditions are mentioned.

22C. Spacecraft Trajectories and Reentry

AD-A078 842/2 PC **A04**/MF **A01**
Johns Hopkins Univ Laurel MD Applied Physics Lab
Evolution of the Orbital Improvement Program.
Technical memo.,
S. C. Dillon. Feb 79, 63p Rept no. APL/JHU/TG-1320
Contract N00024-78-C-5384

The Orbital Improvement Program (OIP) is a massive computer program that determines and predicts orbits for the Navy Navigation Satellite System (Transit system). The system became operational in 1963 and has played a vital part in providing all-weather navigation to worldwide users. The system has been continuously updated and improved. Today, navigation results are regularly under 10 m for operational satellites, providing accuracy far beyond any expectations of the early 1960's. This report describes the evolution of the program, its operational history, and how it has improved navigation accuracy. (Author)

N80-14164/1 PC **A03**/MF **A01**
Analytical Mechanics Associates, Inc., Jericho, NY.
Research in Navigation and Optimization for Space Trajectories.
Final Report, 1 Oct. 1975 - 30 Sep. 1979.
S. Pines, and H. J. Kelley. 30 Sep 79, 50p
NASA-CR-160420, AMA-79-20
Contract NAS9-14818

Topics covered include: (1) initial Cartesian coordinates for rapid precision orbit prediction; (2) accelerating convergence in optimization methods using search routines by applying curvilinear projection ideas; (3) perturbation-magnitude control for difference-quotient estimation of derivatives; and (4) determining the accelerometer bias for in-orbit shuttle trajectories.

N80-14166/6 PC **A11**/MF **A01**
British Aerospace Dynamics (Space), Stevenage (England). Electronic and Space Systems.
Parameter Estimation from Satellite Tracking Data.
Final Report.
T. A. Morley, and E. B. Crellin. Jan 79, 229p
ESS/SS-919, ESA-CR(P)-1233
Contract ESOC-3217/77

The work carried out on processing satellite tracking data to determine improved estimates for many parameters, is described. In the extraction of information from COS-B observations, effort was concentrated on the estimation of measurement biases and the solar radiation pressure coefficient. In several cases convergence to a stable solution were not obtained due to the round off error that arises because of the almost negligible effect of solar radiation pressure on the evolution of the orbit over the duration of the measurement data spans. Consistent estimates for the range biases were not determined from OTS transfer orbit data. However, throughout the study it is evident that range rate measurements are greatly inferior to range measurements for providing information on either the orbital elements or the other uncertain parameters apart from their own associated biases. Some improvement was determined for the estimates of the OTS drag coefficient and the velocity increment of one of the reorientation maneuver. There is good reason to suppose that these estimations were accompanied by more accurate orbit determination.

22D. Spacecraft Launch Vehicles and Ground Support

N80-14150/0 PC **A06**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
The Deep Space Network.
Progress Report, Sep. - Oct. 1979.
15 Dec 79, 118p NASA-CR-162524, JPL-PR-42-54
Contract NAS7-100

No abstract available.

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